



THE
YOUNG NATURALIST :
A MAGAZINE
OF
NATURAL HISTORY,

CONDUCTED BY

JOHN E. ROBSON, Hartlepool,

WITH THE ASSISTANCE IN VARIOUS DEPARTMENTS OF

| | |
|-------------------------------------|-----------------------------------|
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| JOHN GARDNER, HARTLEPOOL ; | DR. J. W. WILLIAMS, M.A., LONDON. |

VOL. X.

London :

JOHN KEMPSTER & Co., BOLT COURT, 151, FLEET STREET, E.C.

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Erratum.—By an unfortunate blunder in November issue, five words were omitted in first line, page 219. It should read thus:—"geological stratum from the cretaceous period upwards, and consequently presents a great diversity of physical features."



Hartlepool :

B. T. ORD, PRINTER, 69, HIGH STREET.



INTRODUCTION.

THE early history of science informs us of peculiar acquirements by which nations distinguished themselves from the rest of the world. Thus we are told of the skill of the Egyptians in astronomy, to which they were peculiarly led by their manner of reposing on open terraces under a cloudless sky. We learn also from the Old Testament, which if it were merely a human work would be the most venerable monument in the world, that Natural History was very early one of the sciences in the highest estimation. The manner in which Solomon's botanical knowledge is mentioned in the Bible, proves that to have been in those days the most esteemed, perhaps, of all learning whatever. Moses, moreover, appears to have possessed more than an ordinary knowledge of insects, if we suppose, as the ingenious remarks of Professor Lichtenstein render probable, that he distinguishes as clean insects the Fabrician genera *Gryllus*, *Locusta*, *Truxalis*, and *Acheta*, which a person unobservant of these insects would have confounded together. Allusion is oftentimes made in Holy Writ to insects of almost every one of the modern orders,—the locust, bee, moth, fly, lice, &c.; but not once to butterflies. The Prophets frequently introduce them as symbols of enemies that lay waste or oppress the church; and Solomon did not deem insects, those "Little things upon the earth," unworthy of his attention. He even advised the sluggard to go to the ant, to consider her ways, and be wise.

With Aristotle, however, begins the real history of science; and how much soever he may have erred on particular points, the greatness of his conceptions and the justness of his ideas on the whole, entitle him to our high veneration. His labours in the investigation of the animal kingdom have laid the foundation of the knowledge we now possess, and it cannot sufficiently be regretted that we have only an imperfect account of his discoveries. Theophrastus, the worthy disciple of Aristotle, has given us the first scientific views of the

vegetable and mineral kingdoms. These two great men stand unrivalled as the only philosophical naturalists of antiquity of whom we have any satisfactory knowledge.

Several ages after came Pliny, who has transmitted to us, so far as he was able, all that was known of natural history at the time in which he lived. Apollodorus, as Pliny informs us, was the first monographer of insects, since he wrote a treatise upon scorpions, and described nine species. Ælian also, amongst other animals, mentions insects. From him we learn incidently that artificial flies were sometimes used by Grecian anglers.

From the time of Pliny and Ælian, 1400 years rolled away, in which scarcely anything was done or attempted for entomology or natural history in general. During that long period the glimmer of only one luminary appeared to make a short and feeble twilight. In the middle of the thirteenth century Albertus Magnus devoted one out of twenty-one folio volumes to natural history. He gives a very correct account of the pit-falls of the Ant Lion. Insects he distinguishes by the name of *Anulosa*. He also calls them worms, describing butterflies as flying worms; and what is still more extraordinary, the toad and the frog, which he includes amongst his *Anulosa*, he calls quadruped-worms.

After the taking of Constantinople by the Turks in the middle of the fifteenth century, the light of learning, kindled by those of its professors who escaped from that ruin, appeared in the West. The Greek language then began to be studied universally; and in consequence of the coeval invention of the art of printing, various editions of the Greek works of the ancients were published: amongst the rest, those of the fathers of natural history. From the perusal of those works, the love of the sciences of which they treated revived in the West, and the attention of scientific men began to direct itself to the consideration and study of the works of their Creator. In the latter part of that century, a work entitled the "*Book of Nature*" appeared in the German language, in which animals and plants were treated of and rudely figured, as they were likewise most miserably in "*Cuba's Ortus Sanitatis*," published in 1485. In this work, insects and crabs were described under the three different denominations of Animals, Birds, and Fishes. Conrad Gesner, the greatest naturalist the world had ever seen since Aristotle, was born at Zurich, in 1516, and died in 1565. He founded and supported a botanic garden, kept a painter engraver in his service, had a very considerable library, and, according to Haller, was the first who ever formed a museum of natural history. Ulysses Aldromandus resembled Gesner in the indefatigable industry and zeal for the advancement of natural history. His memory

has been much honoured at Bologna, where he died in 1605. The great zoological work, which he left imperfect was finished after his death; and the first attempt at a separate and systematical arrangement of insects subsequent to the times of Aristotle, was made in the ponderous volumes. From him Linnæus borrowed the name *Polychloros*, which he bestowed on the Large Tortoise-shell Butterfly. About the same time botany began to be attended to in our own country. Turner published his "Herbal" in 1551, and in 1597 was printed the first edition of Gerard's "Herbal."

The work that is usually called Mouffet's "Theatrum Insectorum" was produced in the seventeenth century, and was the fruit of the successive labours of several men of talent. Dr. Edward Wotton and the celebrated Conrad Gesner laid the foundation; whose manuscripts falling into the hands of Dr. Thomas Penery—an eminent physician and botanist of the Elizabethan age, much devoted to the study of insects—he upon this foundation meditated raising a superstructure which should include a complete history of these animals, but in 1589 he was snatched away by an untimely death. His unfinished manuscripts were purchased at a considerable price by Thomas Mouffet, a contemporary physician of singular learning, who reduced them to order, improved the style, added new matter and not less than 150 additional figures, but before he could commit his labours to the press he also died. The work remained buried in dust and obscurity till it fell into the hands of Sir Theodore Mayerne, one of the court physicians in the time of Charles I., who at length published it in 1634; and it was so well received that in the year 1658, Edward Topsel published an English translation of it. It is the first entomological publication extant in the British Isles, and is embellished with numerous wood engravings, accompanied by long, tedious, and sometimes superstitious descriptions of the articles they represent, which are systematically divided into two books and forty-two caputs. The 14th caput treats "De Papilionilibus," and occupies above twenty pages, in the margins of which are inserted, in an indented manner, 112 woodcuts of the rudest execution imaginable; yet, for the most part, perfectly intelligible to any person tolerably skilled in the science of entomology. In it the moths are called nocturnal butterflies, and the butterflies diurnal butterflies. Amongst the latter, one can recognise the following British species:—Swallow-tail, Scarce Swallow-tail, Orange-tip, Brimstone, Green-veined White, Clouded Yellow, Common Blue, Wall, Speckled Wood, Painted Lady, Red Admiral, Large Tortoise-shell, Small Tortoise-shell, Peacock, Silver Spotted Fritillary, and the Silver Spotted Skipper.

One of the most remarkable works of the century we are upon was pub-

lished at Liguity in the year 1603, by Casper Schwenckfield, a physician of Hieschberg, under the title of "*Theriotrophium Silesiæ*." This was probably the first attempt at a fauna that ever was made. In it animals are divided into quadrupeds, reptiles, birds, fishes, and insects.

In 1667, Christopher Merrett, M.D., one of the earliest Fellows of the Royal Society, published at London, his "*Pinax rerum Naturalium Britannicarum, continens Vegetabilia, Animalia, et Fossilia, in hac Insula reperta inchoatus*." It is the first publication which gives any account of British insects exclusively; and contains among other things, a brief catalogue of such as Dr. Merrett knew to be indigenous, each accompanied with a concise descriptive sentence, by way of a name. There are twenty-two descriptive sentences of butterflies; which, according to Mr. Haworth in his "*Review of Entomology*," published in the Transactions of the Entomological Society of London, for the year 1812, belong to the following species:—Large White, Black-veined White, Small White, Speckled Wood, Comma, Ringlet, Brimstone, Wall, Green-veined White, Small Tortoise-shell, Marbled White, Meadow Brown, Wood White, Purple-edged Copper, Green Hairstreak, Common Blue, Large Heath, Brown Skipper, Dark Pearl-bordered Fritillary, Small Heath, and the Silver Spotted Skipper. Mr. Haworth goes on to say "That Merrett should have been acquainted with the Purple-edged Copper is indeed singular; but his words, "*Externis purpurascentibus*," by which I understand *externis marginibus*, &c., absolutely and pointed agree with it; and as absolutely and pointedly disagree with every other known British species."

At page 197 of the *Pinax*, we read exactly as follows: "*Papilio, vel diurnus, a Butterfly, vel nocturnus, a Miller, qui phalæna dicitur ejus species sequuntur. Phalæne major? Exigua argentea nigris maculis rotata, a Moth*." Amongst other insects Dr. Merrett mentions *Staphylinus*, the poisonous caterpillar; *Formica*, Ant, *Emet*, or *Pismire*; *Gryllus*, Cricket; *Locusta* Grasshopper; and *Cicindela*, a Glowworm.

In 1662, Goedart published in Middelburg his "*Metamorphosis et Historia Naturalis Insectorum*," which was done into English and methodized with the addition of notes by Martin Lister in 1685. Goedart is stated to have spent forty years of his life in attending to the proceedings of insects. The improvement he effected in the drawing and engraving of them was great, for his figures, though sometimes incorrect, were far superior to those of his predecessors. He appears also to have been the first author who gave any figures of the caterpillars and chrysalides. The British butterflies he figures are the Peacock, Large Tortoise-shell, Small Tortoise-shell, Painted Lady,

Large White, Small White, and Red Admiral. To the general work Martin Lister added a short appendix on British spiders.

A very inferior book of nature belonging to this century is that by Hollar, published in 1674. In it he gives figures of such fabulous animals as a Flying Dragon and a Griffin. There is also a scanty mention of insects in Nehemiah Grew's "*Rarities of Gresham College*," published in 1681.

Science received a vast impetus by the establishment of the Royal Society, which, from a small beginning at Oxford about the year 1645, made rapid advances when removed to the metropolis in 1662. This learned body bestowed great attention from the beginning upon the physiological part of natural history. The names of Boyle, Evelyn, Hook, and Needham are among the first members of this society. Mr. Willoughby, also, was one of the original fellows, although his friend Ray was not admitted till the year 1667. Dr. Lister, the great conchologist, was very early associated with it, as well as the vegetable physiologist, Dr. Grew.

Many similar institutions were set on foot throughout Europe, as the Imperial Academy *Naturæ Curiosorum*, begun in 1652. An academy was instituted at Paris, in 1666, and another some years after at Montpellier, very similar to the Royal Society of London, with which the greatest men in Europe have always been proud to be associated.

One of the most important events of this century was the complete exposure and refutation of the absurd doctrine of equivocal generation, which had maintained its ground in the schools of philosophy from the time of Aristotle. Our own immortal Harvey was the first who dared to controvert this irrational theory: and his dictum—*Omnia ex ovo*—was copiously discussed and completely established by two of the ablest physiologists that Italy has produced, Redi and Malpighi. The works of Swammerdam also are full of curious information, and will sufficiently reward those whose patience is not to be exhausted by his tedious heavy style.

Towards the end of the century appeared two great naturalists, our countrymen, Willoughby and the illustrious Ray.

John Ray, the son of a blacksmith, was born in 1628, at Black Netley, in Essex. He was bred up to the Church, and finally became one of the brightest ornaments in the history of our science. He was the author of many invaluable works on divinity, morality, and botany. At the advanced age of 75 he began his work on insects, the celebrated "*Historia Insectorum*," for which he had been accumulating materials from 1690 to 1700, but being snatched away from his labours by the hand of death on the 17th of January, 1705, the work, which was nearly ready for the press, was published post-

humously by his friend Dr. Derham, at the command of the Royal Society, in 1710. To it is subjoined "*Appendix de Scarabæis Britannici, auctore M. Lister, F.R.S., ex. M.S.S. Musæi Ashmoleani*," It appears from Ray's letters that his friend Willoughby drew up a history of insects and worms, which probably formed the ground work of the "*Historia Insectorum*," concerning which he says, "The work which I have now entered upon is indeed too much for me, I rely chiefly on Mr. Willoughby's discoveries and the contributions of friends." The principal of these were Dale, to whom he bequeathed his collection of insects; Vernon, who in a letter from Mr. Brume to Mr. Rawlins, June 14th, 1735, in the Bodleian Collection, is stated to have followed a butterfly nine miles before he caught him; Petiver, Jezreel Jones, Antrobus, and Dandridge. The descriptions given in the "*Historia Insectorum*," especially considering the dark ages of this science in which they were written, are masterpieces of clearness and precision, and such as, in general, render it tolerably easy to ascertain the articles they belong to; although unaccompanied with figures: but with respect to the arrangement and distribution of its materials, the work is in both these essential points, unquestionably very far inferior to that of Linnæus; and indeed, in some particulars, is not much superior to its predecessors. For, like them, it also incongruously blends the Linnæan class of Vermes with the genuine and natural one of insects. He estimates the number of butterflies observed by him and his friends in England to be fifty. The species he describes are:—Swallow-tail, Scarce Swallow-tail, Brimstone, Clouded Yellow, Large Cabbage White, Small Cabbage White, Green-veined White, Marbled White or Half-Mourner, Bath White or Greenish-marbled Half-Mourner, Lesser Tortoise-shell, Greater Tortoise-shell, Comma, Silver-streaked Fritillary, Greater Silver-spotted Fritillary, Queen of Spain or Lesser Silver-spotted Fritillary, Light Pearl-bordered or April Fritillary, Dark Pearl-bordered or May Fritillary, Glanville Fritillary, Marsh Fritillary, Duke of Burgundy or Mr. Vernon's Small Fritillary, Painted Lady, Peacock's Eye, Wall or Golden-marbled Butterfly with black eyes, Meadow Brown, Hedge Brown, Small Heath, Small Copper, Small Skipper, Red Admiral, Purple Emperor, White Admiral, Speckled Wood, Black-eyed Marble, Ringlet, Purple Hair-streak, Brown Hair-streak, Common Blue, Heath Blue, Chalk-hill Blue, Azure Blue, Mazarine Blue, Brown Skipper, Spotted Skipper, and Green Hair-streak. He also adds a few exotics found in the museums or cabinets of the curious in and about London.

In a letter to Mr. Derham, bearing the date of 1703, Mr. Ray writes "I have for some years together been a diligent searcher out of Papilios,

diurnal and nocturnal, and though I have found and described near upon 300 species, great and small, within the small compass of four or five miles; yet came I not to the end of them. Now, the genus of beetles is as numerous as that of the Papilios, if not more. The flies (so at present I call all insects that have naked and smooth, not farinaceous wings), both bipennes and quadripennes, are in a manner infinite, nor has their history been with diligence prosecuted by any man that I know of, except Mr. Willoughby; whose manuscript I hope to procure." In another letter he writes, "As for books about insects, written in, or translated into Latin, I know none but Aldromandus, Mouffet, Johnson, and Gædartius, except Malpighius *de Bombyce*, and Dr. Lister *de Araneis*. The best general history, or account of insects, is that of Swammerdam, written in Low-Dutch, and translated into French." One of his friends, James Petiver, published at London a variety of miscellaneous zoological, botanical, and other treatises, illustrated by several thousand figures, each of which is (like the items of Merrett's Pinax) explained by a concise and descriptive sentence, which served as a name. He also was the author of one work, entirely entomological, entitled "Papilionum Britannia Icones, Nomina, &c.," of about eighty English butterflies, being all that have hitherto been discovered in Britain, by James Petiver, F.R.S., London, 1717, folio. It is a valuable publication to the student in British lepidoptera, the figures being (for these times) well executed.

The species are fifty in number, viz: Black-veined White, Great Cabbage White, Small Cabbage White, Green-veined White, Wood White, Brimstone, Clouded Yellow or Saffron, Swallow-tail or Royal William, Orange-tip or White Marbled, Bath White or Vernon's Greenish Half-Mourner, Marbled White or Common Half-Mourner, Red Admiral, White Admiral, Silver-streaked Fritillary, Great Silver-spotted Fritillary, High Brown Fritillary, Heath or Straw May Fritillary, Dark Pearl-bordered Fritillary, Duke of Burgundy or Vernon's Small Fritillary, Light Pearl-bordered Fritillary, Marsh or Dandridge's Black Fritillary, Queen of Spain or Lesser Spotted Fritillary, Glanville or White Dullidge Fritillary, Great Tortoise-shell, Lesser Tortoise-shell, Comma, Small Copper, Spotted Skipper or Brown Marsh Fritillary, Brown Skipper or Handley's Small Brown Butterfly, Painted Lady, Brown Hair-streak, Purple or Ray's Blue Hair-streak, Peacock, Albin's Hampstead Eye, Black-eyed Marble or Tunbridge Grayling, Speckled Wood or Enfield Eye, Wall or London Eye, Meadow Brown or Eye, Hedge Brown or Eye, Ringlet or Brown Eye, Small Heath or Silver-edged Heath Eye, Chalk-hill Blue or Pale Blue Argus, Common Blue or Blue Argus, Heath Blue or Silver-edged Blue Argus, Brown Argus, Azure or Blue Speckt Butterfly,

Green Hair-streak or Holly Butterfly, Small Skipper or Spotless Hog, and the Large Skipper or Cloudy Hog.

The remaining thirty figured by Petiver, are varieties or the other sex of the above. One species, Albin's Hampstead Eye, is a native of Australia, and must have been introduced by Petiver through a mistake. The additions in his work to the list of British Butterflies are the High Brown Fritillary, Heath Fritillary, Brown Argus, Large Skipper, and Small Skipper. Both Petiver and Ray gave English names to many of the species, some of which have been changed since their time.

The publications of Petiver have been of essential service to zoology and botany, but they have become scarce, though a second edition of them, entitled "*Petiveri Opera*," was published in 1764. His museum after his decease, which happened in April, 1718, was purchased by his worthy friend Sir Hans Sloane, for no less than £4,000; a great sum in those days, which at once proves the goodness of the Petiverian collection, and the affluence of the Baronet. It eventually went, along with the vast stores of natural productions amassed by Sir Hans Sloane, to form the basis of that national institution, the British Museum.

Sir Hans Sloane, in the year 1725, published the second volume of his "*Natural History of Jamaica*," including the insects found in that Island.

In the year following was published in Holland, one of the most splendid entomological works ever published, by Madame Marie Sibilla Merian, in the "*Transformations of the Insects of Surinam*," a large folio volume with finely drawn and highly coloured plates of insects, plants, and reptiles.

The work which next arrests our attention is that of Eleazar Albin, a painter of no small ability, who in the year 1731, published at London, a "*Natural History of English Insects*," illustrated with 100 copper-plates, engraven from life; and of which a second edition appeared in 1749, with large notes, and many curious observations by W. Dereham, D.D., Fellow of the Royal Society. This is the first work with coloured illustrations of English insects, and it contains principally, but not exclusively, such lepidopterous insects as the author, or his friends, had reared from caterpillars; exhibiting them picturesquely feeding on their proper plants, and in all phases, or mutations: the whole highly coloured, and accompanied by descriptions in the English language, but without names. This last I mention as Guenee has unadvisedly given Albin as an author of names. The butterflies he figures are the Large Cabbage White, Black-veined White, Brimstone, Red Admiral, Peacock, Small Tortoise-shell, Brown Hairstreak, Green Hairstreak, Painted Lady, Large Tortoise-shell, Comma, Meadow Brown,

Purple Hairstreak, Small Cabbage White, and the Green-veined White. Albin dedicates the plates to various different persons (a custom which has unfortunately fallen out of use in the present century), who bore the expense of the plates; and the entire work to her Royal Highness the Princess of Wales.

In the preface he informs us that Mr. Dandridge employed him in painting caterpillars, and that he painted a lot of caterpillars and flies for Mr. How, and likewise several things relating to natural history for Sir Hans Sloane. Also that the Duchess Dowager of Beaufort employed him in the same manner, and that she was the first to persuade him to undertake his work, and encouraged him by procuring subscriptions from persons of the first quality; amongst them Henry Bentinck, Earl of Portland, father-in-law of the celebrated Duchess of Portland.

I may as well mention here that I have in my possession Albin's original drawings.

He also published in 1736, a Natural History of Spiders, and other curious insects, 200 in number.

In 1739, Professor Bradley published, at London, his "Philosophical Account of the Works of Nature." At page 190 of his work, he informs us that the following were very eminent collectors of insects: "the Duchess of Beaufort, who has bred a greater variety of English insects than were ever rightly observed by any one person in Europe; Sir Hans Sloane; Mr. Vincent; Dr. Ruysch; and Mr. Sebra have surprising collections, where we may observe many thousands of foreign insects; and Mr. Dandridge, who has so industriously collected the insects of our own country." Bradley gives a few engravings of insects, but does not appear to have much advanced the science.

We are now arrived at that period in the history of Entomology, in which it received that, with respect to its general outline, which has been preserved ever since. Swammerdam had altogether deserted the system of Aristotle, and Ray mixed it with that of his predecessor. But two years after the death of Ray was born the greatest naturalist the world has ever been graced with, the immortal Linnæus. This illustrious philosopher was born on the 24th of May, 1707, in the little village of Roëshult, in Sweden, and imbibed a taste for entomology almost as early as botany. In the first edition of his "Systema Naturæ," published in 1735, and contained in only fourteen folio pages, he began to arrange the three kingdoms of nature after his own conceptions. But this initiatory sketch, as might be expected, was very imperfect; and with respect to insects, was extremely inferior to what Ray had effected; for he puts into one order, to which he gives the name of

Angioptera, the Lepidoptera, Neuroptera, Hymenoptera, and Diptera. In this work, however, generic characters were first given. In successive editions he continued to improve upon this outline: in the fourth, he finally settled the the number and denominations of his orders, and also their limits. His system, being founded upon the absence or presence and characters of the organs for flight, is in some degree a republication of the Aristotelian, and may be called the Alary system. The 2nd edition was published in 1740, the 3rd in 1740, the 4th in 1744, the 5th in 1747, the 6th in 1748, the 7th in 1748, the 8th in 1753, the 9th in 1756, the 10th in 1758, the 11th in 1760, the 12th in 1766.

Quite a new turn was given to the science of natural history by the publication of the "*Systema and Fundamenta Botanica* of Linnæus" in 1735. Nor were the learned world determined how they should receive these extraordinary productions, when in 1737 the same author, without any other support than his own transcendent merit, fixed the attention of all Europe by his "*Critica Botanica*," "*Genera Plantarum*," "*Hortus Cliffortianum*," "*Flora Laponica*," and "*Methodus Sexualis*;" five works, the produce of one year, each of which would alone have been sufficient to have immortalized its author, and in the composition of which a man's whole life might have been thought to have been usefully employed. But in no respect were the labours of Linnæus more beneficial to science and zoology in particular, than when he undertook to describe the animals of his own country. His "*Fauna Suecica*," published in 1746, is an admirable exemplar, which greatly stimulated the zoologists of other countries to study their native productions. The last public exertion of Linnæus was a beautiful oration delivered before the University of Upsala, when he resigned his office of Rector. This was in the latter part of the year 1772, in the 65th year of his age, six years before his death, which took place on the 10th January, 1778.

Before his death he was elected a member of twenty academies, including the three of his own country, and in 1753 was dubbed a Knight of the Polar Star by the King of Sweden's own hand. Linnæus had many pupils, whom he persuaded to travel all over the world; he himself travelled over Lapland, all Sweden, part of Norway, Denmark, Germany, Holland, France, and England, in search of knowledge. The most useful of his works to the Entomologist are the "*Fauna Suecica*" and the "*Systema Naturæ*." In the last edition of the latter he has included more than 3000 species of insects, classed them, divided them into genera and species, described them, marked the places where they are to be found, the plants they feed on, their transformations, and cited the authors who have treated of them.

Before the time of Linnæus, names were given to insects somewhat indiscriminately, and, not unfrequently, they were but brief descriptions. Thus, Petiver, in 1717, called the Brimstone Butterfly "*Papilio sulphureus*;" Ray, in 1710, called the Clouded Yellow "*Papilio croceus, apicibus nigricantibus*," and the Bath White "*Papilio leucomelanos Cantabrigiensis*;" Albin, in 1731, called the Black-veined White "*Papilio albus venis nigris*." So, too, in 1769, Wallis, in his "Antiquities and Natural History of Northumberland," called the Comma "The brown and gold butterfly with lacinated wings." Linnæus devised a system of nomenclature that needed but two words for each species. The second of these was the specific, whilst the first showed to what genus the particular species belonged. The Lepidoptera he divided into only three genera: *Papilio*, *Sphinx*, and *Phalæna*. Instead of giving in every instance a fresh set of names, he adopted many from the ancients, such as *Gryllo-talpa*, from Aristotle, for the Mole-cricket; *Cossus*, from Pliny, for the Goat Moth; and *Polychlorus*, from Aldrovandus, for the Large Tortoise-shell Butterfly.

Between the 10th edition of the "*Systema Naturæ*" and the 12th, appeared the following, viz.: Nicole Poda's "*Insecta Musei Græcensis, quæ in ordinibus, genera et species juxta Systema Naturæ Caroli Linnæi digessit*," in 1761; Sepp's "*Nederlandsche Insecten*," commenced in 1762, a beautiful work in which not only the perfect insects, caterpillars, and chrysalides are figured, but also the eggs; Scopoli's "*Entomologia Carniolica Methodo Linnæana*," in 1763, of which I possess a copy with plates; and Geoffroy's "*Historie Des Insects*," in 1764. Geoffroy is principally celebrated as the author of the method generally adopted by modern entomologists, of dividing the Coleoptera into primary sections, according to the number of the joints of their tarsi. His work is further serviceable by indicating many genera not defined by Linnæus. Scopoli, under the name of *Papilio macaronius*, has figured and described a Myrmelion, one of the Neuroptera. His specific names also are heavy, and where altered from the Linnæan are mostly altered for the worse. The liberty he has taken in changing names is unworthy of him, and injurious to science. Under the heading of *Papilio alexis*, he appears to have grouped together two or three distinct species, so that it is impossible to tell to which the name belongs.

For these and other reasons, the 12th edition of the great work of Linnæus, the "*Systema Naturæ*," was decided upon for the starting point of our nomenclature. That this decision is wise there should be no doubt. Linnæus was an exceptionally able man. The binomial system of nomenclature was but an adjunct to the great scheme of arrangement and order

with which he replaced the chaos of an earlier time. In giving names he knew what he was about better than we can know, and when he thought it better to alter a name he had adopted before, or that had been used by others, we may be quite sure he had good reasons for the alteration. Surely the carefully revised completion of a great work is a safer starting point than an earlier and admittedly imperfect edition. It must be borne in mind that I am referring exclusively to the science of entomology, for in the sister science of botany, plants had been divided into species and genera long before the time of Linnæus. For instance, Ray, in his "Catalogues Plantarum Angliæ et Insulæum Adjacentium," published in 1677, divided the perfect plants of our islands into 23 genera.

In a letter to Haller, bearing the date of June 8th, 1737, Linnæus writes: "Those who come after us, in the free republic of Botany, will never subscribe to authorities sanctioned only by antiquity, if we retain such intractable names as *Monolasiocallenomenophyllum* and *Hypophyllocarpodendrium*; why should we therefore retain barbarous or mule names, or names distinguished only by tails. Witness: *Alsine*, *Alsinoides* of Ray, *Alsinella* of Dillenius, *Alsinastrum* of Vaillant, *Alsinastroides* of Kramer, *Alsinastriformis* of Plukenet, *Alsinanthemos* of Ray, and *Alsinanthemum* of Kramer. I could not help laughing when I saw a certain Botanist establish a genus by its tail alone, calling *Convolvuloides*, because it had an upright stem. Why does the termination *oides* displease? Because it is the asylum of ignorance. Botanists seem to me never to have touched upon nomenclature as a subject of study, and therefore this path of their science remains still unexplained."

If we turn to our own British Isles again we find that, in the year of our Lord 1742, Benjamin Wilkes published at London twelve folio copperplates of the more showy English lepidoptera, disposed in imitation of pictures; with an engraved emblematic title, highly ornamented, dedicating the work to the Aurelian Society of that day. The English names of the insects, and often the names of the plants on which they feed, together with the times and places they are found in, are likewise engraved at the foot of each plate, but no letterpress appears to accompany them. The butterflies are the Peacock, White Admiral, Swallow-tail, Red Admiral, High Brown (or more properly) Silver-spotted Fritillary, Large Tortoise-shell, Ultramarine or Common Blue, Purple Hair-streak, Marmoris or Marbled White, Darkened Green or High Brown Fritillary, Comma, Painted Lady, Rock Underwing or Black-eyed Marble, Purple Emperor, Small Pearl-border or Dark Pearl-bordered Fritillary, Great or Silver-striped Fritillary, Clouded Yellow, Small Tortoise-shell, Lady of the Woods or Orange-tip, and the Orange Field Butterfly or Hedge Brown.

This appears to be the only English entomological work during a period of twenty years, the minds of the men of science being wholly occupied with the theories and views of the celebrated Sir Isaac Newton.

We next arrive at a name memorable in the annals of British entomology, that of Moses Harris, who has contributed more, perhaps, than all our entomologists who preceeded him, towards the knowledge and natural history of British insects. He was also one of the first who endeavoured to form an Aurelian Society in this country, for the purpose of recording and diffusing the knowledge he had acquired, and of which he was chosen to be the secretary. The first of his works—"The Aurelian or a Collection of Butterflies and Moths and the Plants on which they feed and are found, Delineated and Coloured, with an Explanation thereof," was published in folio, at London, in the year of our Lord 1766.

The butterflies in the work are 21 in number, viz: The Comma, Small Tortoise-shell, Purple Emperor, Red Admiral, Peacock, Black-veined White, Purple Hair-streak, Painted Lady, Marmoris or Marbled White, Grand Surprize or Camberwell Beauty, Glanville Fritillary, Little Gate-keeper, Green Fly or Hair-streak, Dark Green or Silver-spotted Fritillary, Dishclout or Greasy or Marsh Fritillary, High Brown Fritillary, Clouded Yellow, Wood White, and White Admirable.

The Camberwell Beauty is an addition to the British Fauna.

Now comes a very important period, that of the introduction of the Linnæan system into England, for in 1769, John Berkenhout, M.D., published in English, in small octavo, the first volume of his "Outlines of the Natural History of Great Britain," containing the animal kingdom; and amongst other things, as many insects as he could ascertain, arranged according to the Linnæan system, amounting to about 600 species. The butterflies he includes are as follows:—1, *Machaon*, Royal William or Swallow-tail; 2, *Podalirius*; 3, *Cratægi*, White Butterfly, with black veins; 4, *Brassicæ*, Great White Cabbage; 5, *Rapæ*, Small White Cabbage; 6, *Napi*, White Butterfly, with green veins; 7, *Cardamines*, Orange-tip; 8, *Hyale*, Spanish Butterfly, more properly *Edusa*, Clouded Yellow; 9, *Rhamni*, Brimstone; 10, *Hyperantus*, Brown-eyed or Ringlet; 11, *Io*, Peacock; 12, *Mæra*, Great Argus, more properly *Megæra*, Wall; 13, *Ægeria*, Wood Argus or Speckled Wood; 14, *Galathea*, Marble; 15, *Semele*, Black-eyed Marble; 16, *Jurtina*, Meadow Brown; 17, *Cardui*, Painted Lady; 18, *Iris*, Emperor of the Woods or Purple High-flyer; 19, *Antiopa*, Willow Butterfly or Camberwell Beauty; 20, *Polychlorus*, Great Tortoise-shell; 21, *Urticæ*, Small Tortoise-shell; 22, *C-album*, Comma; 23, *Atalanta*, Red Admiral;

24, *Lucina*, Small Fritillary or Duke of Burgundy; 25, *Maturna*, Heath Fritillary, more properly *Athalia*; 26, *Cinxia*, Plantain or Glanville Fritillary; 27, *Paphia*, Great or Silver-striped Fritillary; 28, *Aglaia*, Great Fritillary with silver spots; 29, *Lathonia*, Less Silver-spotted Fritillary or Queen of Spain; 30, *Euphrosyne*, April or Light Pearl-bordered Fritillary; 31, *Betulæ*, Brown Hair-streak; 32, *Quercus*, Purple Hair-streak; 33, *Argus*, Blue Argus, more properly *Icarus*; 34, *Argiolus*, Azure Blue; 35, *Pamphilus*, Small Heath or Little Gate-keeper; 36, *Rubi*, Green Hair-streak; 37, *Phlæas*, Small Golden Black-spotted Butterfly or Small Copper; 38, *Comma*, Chequered Hog or Pearl Skipper; 39, *Malvæ*, Grizzle or Brown Marsh Fritillary, more properly *Alveolus* or Spotted Skipper.

In 1770, the following year, John Reinhold Forster, published at Warrington, a "Catalogue of British Insects." This was a mere catalogue of Latin names, but the most extensive yet made, amounting to a thousand species.

In 1772, "The Naturalist and Traveller's Companion," by Dr. Lettsom, was published at London, giving directions how to collect and preserve all sorts of natural productions, and is a very useful book especially to beginners.

We now come to a year fertile in the produce of entomological works, for in 1773, Yeats, published at London, his "Institutions of Entomology, being a translation of Linnæus' 'Ordines et Genera Insectorum:'" or systematic arrangement of insects, collated with the different systems of Geoffroy, Schaffer, and Scopoli." This is an excellent publication for its time. In it, Yeats writes: The division of the butterflies into families, from the circumstances chosen by Linnæus, seems liable to many objections: the family of the Plebeii, in particular, is very inaccurate, and contains insects very different from one another. Scopoli and Geoffroy have divided this genus into different families from the number of their feet; a method which cannot easily be pursued in cabinets where exotic butterflies are admitted, these parts being generally destroyed before such insects reach Europe. The other circumstances from which Geoffroy has taken his divisions into families, viz., the form of the caterpillars, is totally impracticable, except where the collector admits no other butterflies into his cabinet, but such as he himself possessed in the caterpillar state. Geoffroy has, besides changing the orders of the Linnæan system, formed from the different families of Linnæan genera many new genera, some of them very judiciously, others perhaps without sufficient grounds. Schæffer, in his 'Elementa Entomologiæ,' printed at Ratisbon, in 1776, has followed Geoffrey with very few and inconsiderable variations. I should have been glad to have given some account of the system of Poda, a Jesuit, a work much praised by Scopoli, but have not

been able to procure it, nor learn how or in what he differs from Linnæus."

In 1773, appeared the splendid work of Benjamin Wilkes, entitled, "One hundred and twenty plates of English Moths and Butterflies." The insects are figured after the manner of Albin, but far more sumptuously: and are accompanied by English descriptions of the caterpillars and chysalides, but not of the perfect state; and are entirely destitute of Latin, generic, and specific names, and references to the inestimable works of Linnæus. The butterflies figured are the Swallow-tail, Brimstone, Black-veined White, Small Garden White, Green-veined White, Large Garden White, Orange-tip or Lady of the Woods, Marble White or Marmoris, Meadow Brown, Wall or Great Argus, Speckled Wood or Wood Argus—a foreign species of Skipper feeding on mallow, figured in mistake for the Grizzle or Spotted Skipper, Red Admiral, Peacock, Painted Lady, Great Tortoise-shell, Small Tortoise-shell, Comma, Great Silver-striped Fritillary, Glanville or Plantain, Heath Fritillary, Willow or Camberwell Beauty, Small or Marsh Fritillary, Great Silver-spotted Fritillary, Purple Hair-streak, Brown Hair-streak, Green Hair-streak, Common Blue, and the Purple High-flyer or Emperor of the Woods.

Wilkes, in his "Preface," informs us that he has been greatly assisted by that well-known and ingenious naturalist, Mr. Joseph Dandridge; to whose noble collection he had free access to during his lifetime, and also the liberty of making what use he thought fit of his curious remarks on those subjects, which were the fruits of no less than forty years experience: and that he must also acknowledge that he has made use of the drawings of some caterpillar and flies which were published in 1746, by J. A. Rosel, at Nuremburgh, in Germany. Wilkes also has introduced a fresh system of classification built upon the caterpillar state. The butterflies he has divided into four classes, viz: 1, Smooth caterpillars; 2, Having little hair; 3, Armed with spikes 4, Shaped like wood-lice.

At the same period Dr. Drury published a beautiful work on "Entomology," containing comprehensive descriptions in English and French, with an index of Linnæan names at the end, and a great many coloured upper-plates of such interesting exotic insects, as had not before been, or were insufficiently figured. The icons were executed by Moses Harris in his best style, and are far superior to any of their predecessors in Britain.

Mr. Drury's cabinet was one of the most extensive hitherto made, and is said to have contained, in species and varieties, the number of 11,000 species. He spared no pains or cost in getting them together, and like Petiver, sent printed instructions, in various languages, all over the world for that purpose, by captains of ships and others. Soon after his death, in 1810, his collection

was sold by auction, and produced £650 : one single butterfly selling for no less than twelve guineas.

The above mentioned Moses Harris has contributed more than all the Entomologists who preceded him, towards the knowledge and natural history of British insects.

In 1775, he published the "Aurelian's Pocket Companion," containing a catalogue of four hundred English Moths and Butterflies, the food of their respective caterpillars, the time of changing into chrysalides, appearance in the winged state, and places where they are usually found, together with a concise description of each, and their dimensions, in inches and quarters; also the Linnean names in the last column with the number annexed to each species, as it is numerically placed by Linnæus in the 12th edition of the "Systema Naturæ." The Linnean names given are: *Camilla*, *Atalanta*, *Argiolus*, *Rhamni*, *Jurtina*, *Rubi*, *C. album*, *Virgaurea*, *Iris*, *Paphia*, *Adippe*, *Aglaia*, *Euphrosyne*, *Maturna*, *Lathonia*, *Cinxia*, *Lucina*, *Semele*, *Megæra*, *Pamphilus*, *Cardui*, *Cardamines*, *Io*, *Hyperantus*, *Polychloros*, *Urticæ*, *Comma*, *Tages*, *Betula*, *Quercus*, *Antiopa*, *Machaon*, *Brassicæ*, *Rapæ*, *Cratægi*, *Napi*, *Ægeria*, *Galathea*, *Mæra*, and *Hyale*. Of these, *Camilla*, *Virgaurea*, *Maturna*, and *Mæra*, are not British, and are simply given in mistake for *Sibylla*, *Phlæas*, *Athalia*, and *Tithonus*.

The English names stand in the first column, and are in alphabetical order, thus:—Admirable White, Admirable, Blue Azure, Blue Common, Blue Argus, Blue Clifden, Blue Chalkhill, Blue Silver-studded, Brimstone, Brown Meadow, Bramble or Green Fly, Comma, Copper, Emperor Purple, Fritillaria Silver-wash, Fritillaria High Brown, Fritillaria Dark Green, Fritillaria Pearl Border, Fritillaria Pearl Border Likeness, Fritillaria Greasy, Fritillaria Queen of Spain, Fritillaria Glanville, Fritillaria Duke of Burgundy, Fritillaria Small Pearl Border, Grayline, Gristle or Spotted Skipper, Keeper Large Gate, Keeper Small, Lady Painted, Lady of the woods or Orange-tip, Peacock, Ringlett, Tortoise-shell Large, Tortoise-shell Small, Skipper Large, Skipper Small, Skipper Dingy, Skipper Pearl, Streak Brown Hair, Surprise Grand, Streak Dark Hair, Tail swallow, White Large Garden, White Small Garden, White Green-veined, White Black-veined, White Wood, White Marbled, Wood Speckled, Wall, Yellow Clouded, Yellow Pale Clouded : 53 in all.

In 1778, was published a second edition of "The Aurelian: or Natural History of English insects, namely, Butterflies and Moths," with great additions; and in 1782, Moses Harris published his "Exposition of English Insects," which is illustrated by 51 copperplates, whereon are depicted about 500 figures of insects, of all the various orders, exclusive of butterflies. He

was likewise the author of a little work, without a date, entitled "An Essay, preceding a Supplement to the Aurelian, wherein are considered the tendons and membranes of the wings of butterflies," in which he ingeniously gives a method of arranging the Papiliones into natural families, from the difference of structure observable in the nerves of their wings.

In 1781, appeared, in English and French, "The Genera Insectorum of Linnæus," exemplified by various specimens of English insects, drawn from nature. This was the first work which made known, by figures, the system of Linnæus on insects, and the various genera which it contained.

About this period, William Curtis, a celebrated botanist, published "An Essay on the Brown-tail Moth," "Instructions for Collecting and Preserving Insects," and a "Translation of the Fundamenta Entomologiæ of Linnæus," illustrated with copperplates and additions, and to which is prefixed a chronological catalogue of entomological authors; this latter was published in 1772.

In 1785, Matthew Martyn published at Exeter, "The Aurelian's Vade Mecum," containing an English alphabetical and Linnæan systematical catalogues of plants affording nourishment to butterflies, hawk moths, and moths in the caterpillar state, collected from various authors.

If we turn again to the Continent, we find that in 1766, Hufnägel published descriptions of butterflies and moths in a Berlin magazine; but as they are poor even for the age, they have been ignored by all the greatest entomologists as being injurious to science and likely to be misunderstood. Pallis' descriptions in 1771 are likewise bad. We next come to the celebrated De Geer, who united in himself the highest merit of almost every department of that science. Both as a systematist, an anatomist, and physiologist, and as the observant historian of the manners and economy of insects, his "Memoires pour servir à l'Histoire des Insectes" is above all praise. His system is contained in a posthumous volume published in 1778.

We are now arrived, if its consequence be considered, at one of the most important epochs of the science. Fabricius, a pupil of Linnæus, who highly estimated his entomological acquirements, thinking that the system of his master was not built upon a foundation sufficiently fixed and restricted, conceived the idea of doing for Entomology what the latter had done for Botany. As the learned and illustrious Swede had assumed the fructification for the basis of his system in that science, so the emulous and highly gifted Dane, observing how happily those organs were employed as character in extricating the genera of vertebrate animals, assumed the instruments of mastication, far more numerous and varied in insects, for the basis of a new system of entomology, which from the maxillæ being principally employed to characterize the order, may be called the Maxillary System.

The first outline of his system appeared in his "*Systema Entomologiæ*," published in 1775, and the last in his "*Supplement to Entomologia Systematica*," in 1798. The other works he published were the "*Genera Insectorum*," which contained the natural definitions of the species, in 1776; the "*Philosophia Entomologica*," in 1778; the "*Species Insectorum*," in 1782, which appeared in two volumes as a continuation of the "*Systema Entomologica*"; and the "*Mantissa Insectorum*," in 1787, in two volumes, which contained more particularly the corrections and additions which he obtained on his travels to Vienna and St. Petersburg. In his "*Philosophia Entomologica*," drawn up on the plan of the "*Philosophia Botanica*," of Linnæus, he bequeathed to the science a standard work to be studied by every entomologist. His incredible labour in depicting new genera, and describing new species, with which view he travelled into various parts of Europe, and seven times into Britain, have been of infinite service, and have placed the science upon a footing much nearer to that of botany than it had ever before attained.

The principal object of his tour to Vienna was to form an acquaintance with the authors of "*Lepidoptera of the vicinity of Vienna*," the principal of whom was Schiffermüller, whom the Emperor Joseph had appointed director of the Northern Institute at Lenz. This Vienna Catalogue, or W.V. as it is usually called, was published in 1775, by Denis and Schiffermüller, two officers of the Austrian army.

Fabricius died in 1810, at the age of 63. Linnæus is reported thus to have spoken of him: "When Fabricius asks me concerning an insect, I take off my hat, and I say unto him, be thou my teacher."

Between the first of Fabricius' works which appeared in 1775, and the last which appeared in 1798, were published the works of Borkhausen, in 1788; of Fourcroy, on the "*Entomology of Paris*," in 1785; of Christian Müller, in 1785; of Von Rottenburg, in 1775, &c.

More confusion exists as to the names given between the years 1770 and 1790 than at any other period in the annals of entomological science. Fabricius, following the example of his master, the illustrious Linnæus, attempted to combine in some degree Natural and Civil History, by attaching the names of persons, illustrious in their day, to the butterflies, and considering the matter of a year or two of no importance, adopted the name of *Adonis* given in the Vienna Catalogue of 1776, to that of the senseless name *Bellargus*, given in "*Der Naturforscher*," published in 1775. Likewise he gave preference to that of *Alsus*, W.V., over that of the misleading name of *Minima*, given by Fuessli in 1775. If entomologists of more modern times only bowed to the wisdom and discretion of Fabricius, instead of following

the stern and harsh rule of priority to too great an extent, much confusion would be avoided. And, after all, are the publishers' dates of any vital importance? Is it of any real importance whether a certain name was given in 1775 or 1776? Perhaps the work published in 1776 was really written before that published in 1775, and delayed being given to the world through some error on the part of the publisher.

If we turn to our own country again, we find that the Linnæan Society was instituted in London in 1788, under the direction and presidency of Dr. J. E. Smith. On the death of Charles Linnæus, son of the great Linnæus, in 1783, the whole of the collections of both father and son; the library, consisting of about 2,500 volumes; and the manuscripts and correspondence, were offered to Sir Joseph Banks, as the most liberal and wealthy naturalist in Europe, for the sum of 1,000 guineas. Sir Joseph himself declined the purchase, but recommended it to the consideration of his friend, Dr. Smith. After some negociation the bargain was concluded, and these inestimable treasures were sent to England in twenty-six large packages.

Two years previously, on the 24th of April, 1786, and thirty-seven following days, was sold by public auction, the museum belonging to and founded by the celebrated Duchess Dowager of Portland.

In 1789, the celebrated Gilbert White published the "Natural History and Antiquities of Selborne; and in the following year was published the "Naturalist's Miscellany," by Dr. Shaw and Fred. T. Nodder.

The next writer is Edward Donovan, who in 1792, began to publish, at London, "The Natural History of British Insects," explaining them in their various states, with the periods of their transformations, their food, economy, as illustrated by coloured figures, designed and executed from living specimens. It was regularly published in monthly numbers, until fourteen volumes of twelve numbers each were completed, when it closed in 1810. This work did much to forward the progress of entomology in Britain, as did that of Lewin, entitled "The Insects of Great Britain, systematically arranged, accurately engraved, and painted from nature, with the natural history of each species, from a close application to the subject, and observations made in different counties of this kingdom; as well as from breeding numbers from the egg, as caterpillar, during the last thirty years. The figures engraved from the subjects themselves by the author, William Lewin, Fellow of the Linnæan Society, and printed under his immediate direction." Vol. I., London, 1795.

This volume contains all the butterflies known in the British Isles, and is a valuable publication. No others were published owing to the death of the author. The species contained in the work are 62 in number, viz:—

Antiopa or Camberwell Beauty, *Polychloros* or Large Tortoise-shell, *Urtica* or Small Tortoise-shell, *Io* or Peacock, *C-album* or Comma, *Atalanta* or Red Admiral, *Camilla* or White Admiral (more properly *Sibylla*), *Cardui* or Painted Lady, *Paphia* or Silver-washed Fritillary, *Adippe* or High Brown Fritillary, *Aglaia* or Silver-spotted Fritillary, *Lathonia* or Queen of Spain Fritillary, *Euphrosyne* or Light Pearl-bordered Fritillary, *Euphrasia* (more properly *Selene*) or Dark Pearl-bordered Fritillary, *Cinxia* or Glanville Fritillary, *Dictynna* (more properly *Athalia*) or Heath Fritillary, *Artemis* or Marsh Fritillary, *Lucina* or Duke of Burgundy, *Iris* or Purple Emperor, *Semele* or Great Argus or Black-eyed Marble, *Janira* or Meadow Brown, *Ægeria* or Speckled Wood, *Hyperantus* or Ringlet, *Megæra* or Wall, *Tithonus* or Hedge Brown, *Pamphilus* or Small Gate-keeper, *Hero* (more properly *Davus*) or Manchester Argus, *Galathea* or Marbled White, *Cratægi* or Black-veined White, *Brassicæ* or Large Garden White, *Rapæ* or Small Garden White, *Napi* or Green-veined White, *Daplidice* or Bath White, *Sinapis* or Wood White, *Cardamines* or Orange-tip, *Rhamni* or Brimstone, *Electra* (more properly *Edusa*) or Clouded Yellow, *Hyale* or Pale Clouded Yellow, *Machaon* or Swallow-tail, *Podalirus* or Scarce Swallow-tail (a doubtful British species), *Corydon* or Chalk-hill Blue, *Argiolus* or Azure Blue, *Arion* or Large Blue, *Hyacinthus* or *Dorylas*, Glossy or Dartford Blue (a doubtful British species), *Adonis* or Clifden Blue, *Cimon* or *Acis*, Dark or Mazarine Blue, *Icarus* or Common Blue, *Argus* or *Ægon* or Silver-studded Blue, *Alsus* or Small Blue, *Idas* or *Medon* or Brown Argus, *Artaxerxes* or Brown White Spot (the Scotch variety of last), *Hippothoe* or *Dispar* or Large Copper, *Virgaureæ* or Scarce Copper (a doubtful British species), *Phlæas* or Small Copper, *Betula* or Brown Hairstreak, *Quercus* or Purple Hairstreak, *Pruni* (more properly *W-album*) or Dark Hairstreak, *Rubi* or Green Hairstreak, *Comma* or Pearl Skipper, *Tages* or Brown Skipper, *Thaumas* or *Linea* or Small Skipper, *Sylvanus* or Large Skipper, *Malvæ* or Spotted Skipper (more properly *Alveolus*), and *Fritillum*, a variety of the last.

This brings to a close the eighteenth century, the latter half of which was excessively productive of entomological literature. It will be observed that Lewin, in 1795 was only acquainted with twelve species unknown to Petiver in 1717, and of these, three are not now admitted as British. Since the publication of Lewin's work, only eight species of butterflies have been added to the British list, viz., *Paniscus* in 1798, *Blandina* in 1804, *Cassiope* in 1809, *Pruni* in 1828, *Actæon* in 1832, *Bæticus* in 1859, *Plexippus* in 1876, and *Argiades* in 1885.

The first entomological work of the present century is an English translation of the "*Systema Naturæ*" of Linnæus, by Wm. Turton, M.D., F.L.S.,

published in the year 1800; and in 1803 appeared the first volume of the "Lepidoptera Britannicæ," by Alexander Hadrian Haworth, founder of the Aurelian, afterwards Entomological Society of London. He includes all the butterflies mentioned by Lewin, and in addition, *Helice*, the white female variety of *Edusa*; *Eurypome*, not a British species at all; *Polydama* and *Typhon*, varieties of *Davus*; *Charlotta*, a variety of *Aglaia*; *Eos*, a variety of *Athalia*; *Chryseis*, a doubtful British species; *Paniscus*; *Tessellata*, a variety of *Athalia*; *Hampstediensis*, not a British species, but an inhabitant of Australia; and *Apollo*, as a doubtful native, in the preface.

The "Lepidoptera Britannica" was preceded in 1801, by the "*Prodromus Lepidopterorum Britannicæum*," of the same author, but which was anonymously submitted to the inspection of the entomological world. It was a mere catalogue of names of lepidoptera, with their times and places of appearance in the winged state. On the other hand, the "Lepidoptera Britannica" was the first work on British lepidoptera published upon a general and scientific scale.

In 1802, was likewise published at Edinburgh, the second volume of Stewart's "Elements of Natural History," containing the entomological portion, which is more extensive concerning British insects than any previous work, but no less than twenty very doubtful ones are included.

In 1806, was published "The British Miscellany," by J. Sowerby, F.L.S. The butterflies figured in it are *Charlotta*, *Blandina*, *Ligea*, and *Chryseis*.

In 1812, was published the first volume of the "Transactions of the Entomological Society of London"; and in 1819, Samouelle's "Entomologist's Compendium." Two more important works shortly after appeared, namely, "Illustrations of British Entomology," by Jas. F. Stephens, F.L.S., and "British Entomology," by John Curtis, F.L.S. In the latter are figures of the following butterflies, most admirably executed, viz.:—*Podalirius*, *Cratægi*, *Rhamni*, *Hyale*, *Daphidice*, *Hero* (not a British species), *Arcanius* (another foreigner), *Antiopa*, *Iris*, *Camilla* (more properly *Sibylla*), *Aglaia* (a very dark variety), *Selene*, *Lucina*, *Pruni*, *Dispar*, and *Actæon*. The former author, whilst considering it absurd to consider *Podalirius* any longer to be a British species, yet figures and admits *Colias Philodice*, a native of America.

The other most useful works of the present century are, viz.:—"Introduction to Entomology," by Messrs. Kirby and Spence; "An Introduction to the Modern Classification of Insects," by J. O. Westwood, Professor of Zoology to the University of Oxford, and the greatest of British entomologists; Miss Jermyn's "Entomologist's Vade Mecum"; "British Butterflies," by Messrs. Humphreys and Westwood, in 1841; Stainton's "Manual,"

in 1857; Rev. F. O. Morris's "British Butterflies, in 1853; and Newman's "British Butterflies," in 1871. Besides these much valuable information may be gathered from Loudon's "Magazine of Natural History," commenced in 1829; the "Zoologist" commenced in 1843; the "Entomologist" in 1840; the "Entomological Magazine" in 1833; the "Entomologist's Monthly Magazine" in 1864; the "Entomologist's Annual" commenced in 1855 and concluded in 1871; the "Young Naturalist," commenced in 1879; and various other works and periodicals, which it is needless to mention.

List of the British Butterflies, with the year in which they were first captured or made known as British, and the name of the first captor and of the author and publication in which they are first brought forward as British.

| | | |
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| 1667. | <i>Brassica.</i> | Merrett's Pinax. |
| 1667. | <i>Cratægi.</i> | Merrett's Pinax. |
| 1667. | <i>Rapæ.</i> | Merrett's Pinax. |
| 1667. | <i>Napi.</i> | Merrett's Pinax. |
| 1667. | <i>Sinapis.</i> | Merrett's Pinax. |
| 1667. | <i>Rhamni.</i> | Merrett's Pinax. |
| 1667. | <i>Galathea.</i> | Merrett's Pinax. |
| 1667. | <i>Megæra.</i> | Merrett's Pinax. |
| 1667. | <i>Ægeria.</i> | Merrett's Pinax. |
| 1667. | <i>Hyperanthus.</i> | Merrett's Pinax. |
| 1667. | <i>Janira.</i> | Merrett's Pinax. |
| 1667. | <i>Tithonus.</i> | Merrett's Pinax. |
| 1667. | <i>Pamphilus.</i> | Merrett's Pinax. |
| 1667. | <i>C-album.</i> | Merrett's Pinax. |
| 1667. | <i>Urticæ.</i> | Merrett's Pinax. |
| 1667. | <i>Selene.</i> | Merrett's Pinax. |
| 1667. | <i>Rubi.</i> | Merrett's Pinax. |
| 1667. | <i>Chryseis.</i> | Merrett's Pinax. |
| 1667. | <i>Icarus.</i> | Merrett's Pinax. |
| 1667. | <i>Tages.</i> | Merrett's Pinax. |
| 1667. | <i>Comma.</i> | Merrett's Pinax. |
| 1692. | <i>Quercus.</i> | See Ray's Historia Insectorum. |
| 1695. | <i>Iris.</i> | By Courtman. See Ray's Historia Insectorum. |
| 1695. | <i>Sibylla.</i> | By Morton. See Ray's Historia Insectorum. |
| 1695. | <i>Polychloros.</i> | See Ray's Historia Insectorum. |

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| 1697. | <i>Semele.</i> | See Ray's Historia Insectorum. |
| 1710. | <i>Machaon.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Podalirius.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Edusa.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Cardamines.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Daplidice.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Paphia.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Aglaia.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Euphrosyne.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Lathonia.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Athalia.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Cinxia.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Artemis.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Lucina.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Cardui.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Io.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Alalanta.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Phlæas.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Betulæ.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Corydon.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Ægon.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Acis.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Argiolus.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Linea.</i> | Ray's Historia Insectorum. |
| 1710. | <i>Alveolus.</i> | Ray's Historia Insectorum. |
| 1717. | <i>Adippe.</i> | Petiver's Papilionum Britanniae. |
| 1717. | <i>Agestis.</i> | Petiver's Papilionum Britanniae. |
| 1717. | <i>Sylvanus.</i> | Petiver's Papilionum Britanniae. |
| 1748. | <i>Antiopæ.</i> | See Harris' Aurelian. |
| 1775. | <i>Hyale.</i> | Harris' Aurelian's Pocket Companion. |
| 1775. | <i>W-album.</i> | Harris' Aurelian's Pocket Companion. |
| 1775. | <i>Adonis.</i> | Harris' Aurelian's Pocket Companion. |
| 1795. | <i>Arion.</i> | Lewin's Insects of Great Britain. |
| 1795. | <i>Dorylas.</i> | Lewin's Insects of Great Britain. |
| 1795. | <i>Artaxerxes.</i> | Lewin's Insects of Great Britain. |
| 1795. | <i>Alsus.</i> | Lewin's Insects of Great Britain. |
| 1795. | <i>Dispar.</i> | Lewin's Insects of Great Britain. |
| 1798. | <i>Paniscus.</i> | By Dr. Abbott. See Linn. Trans., Vol. V. |
| 1804. | <i>Medea.</i> | By Dr. Walker. See Don. Nat. Hist. Vol. XII. |
| 1809. | <i>Epiphron.</i> | By T. S. Stothard, R.A. See Ent. Trans. Vol. I. |



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| 1828. | <i>Pruni.</i> | By W. Seaman. See Curt. Brit. Ent. |
| 1832. | <i>Actæon.</i> | By J. C. Dale, F.L.S. See Curt. Brit. Ent. |
| 1859. | <i>Bæticus.</i> | By W. McArthur. See Entomologist. |
| 1876. | <i>Plexippus.</i> | By J. T. Llewelyn. See Entomologist. |
| 1885. | <i>Argiades.</i> | By Rev. O. P. Cambridge. See Entomologist. |

Various kinds of butterflies are remarkable for their periodical or irregular appearance. Of these, the species of *Colias* or Clouded Yellows, the Painted Lady, and the Camberwell Beauty are pre-eminent; thus the last-named will not be seen for eight, ten, or more years, according to Mr. Haworth, and then will appear as plentifully as before, indeed in 1789 it occurred in such profusion as to obtain the name of the "Grand Surprise" from the Aurelians of that time. In 1872, it also occurred all over the country. 1877 will be remembered as the great "Clouded Yellow year," and in 1879 the Painted Lady absolutely swarmed. In the autumn of 1872, the Bath White and the Queen of Spain were also taken freely on the Kentish coast.

None who live in the country can be ignorant of their existence. From the first sunny days in February or March, when the Brimstone emerges from its winter's retreat, to chilly November when we see the Red Admiral feasting on the ivy bloom, they are always before us. In gardens we find Brimstones and White, an occasional Meadow Brown, Peacocks, and Tortoise-shells, Painted Ladies and Red Admirals, Blues and Small Coppers. In lanes we find, in addition to these, several species of Browns, and perhaps the Fritillaries, Hair-streaks, and Skippers. The Purple Emperor, White Admiral, and most of the Fritillaries require to be sought for in woods; and the Marble White, some of the Blues, and one of the Skippers (*Hesperia comma*) on chalk downs. The Swallow-tail, although gone from most parts of England, is still to be found in the fens of the Eastern Counties. The Clouded Yellows frequent meadow, lucerne, and clover fields on the South Coast in autumn; and the Lulworth Skipper occurs on the coasts of Dorset and Devonshire. If we visit the North of England and Scotland, we shall find the two species of *Erebia* and *Cænonympha typhon* on the mountains and moors; and the latter country enjoys almost the exclusive privilege of supplying *Lycæna Artaxerxes* to our collections; the variety occurring occasionally with the type on the Durham coast also. Heaths are frequented by *Satyrus Semele* and *Lycæna Ægon*. Although some of our butterflies are exceedingly local, only six are very rare with us, viz. :—*Pieris Daphidice* or Bath White, *Argynnis Lathonia* or Queen of Spain, *Chrysophanus Dispar* or Large Copper (an extinct species), *Polyommatus Acis* or Mazarine Blue, *P. Argiades* and *P. Bæticus*.

THE YOUNG NATURALIST:

A MONTHLY MAGAZINE OF NATURAL HISTORY.

VOLUME X.

1889.

Notable Lepidoptera in 1888.

By JOHN E. ROBSON.

THE past year has been a very abnormal one. A late spring, a wet summer, an early winter. In most of places Lepidoptera have been scarce, even when the weather permitted collecting to be attempted. Yet the year has been a notable one in many respects, and I will endeavour briefly to call attention to some of the more interesting facts in connection with the larger Lepidoptera.

The first thing to mention is something that did not occur. In the autumn of 1887 the three "common whites," *Pieris brassicae*, *rapae*, and *napi*, were unusually numerous. It was natural to expect that the spring brood of 1888 would also have been an abundant one, but none of the species were specially numerous. It is certainly curious, and needing explanation, that the occurrence of a "swarm" of any species is rarely or never followed by an abnormal abundance in the succeeding emergence. A large number of *Vanessa cardui* were on the wing in the early part of last year, but I never heard of it in the autumn, and was quite unable to find any larvæ, even where I had seen the imagines in profusion. Another species, *Anthrocaris cardamines*, was also very abundant on the wing before the rainy season. It is not a species that has previously been noticed for appearing in any extraordinary numbers, and it will be interesting to know the result this season. I will be glad if readers will communicate on the subject when it appears in the coming spring.

Colias Edusa has been recorded from a very few places. *Colias Hyale* not all. My own opinion of these butterflies is that were it not for

immigration both would disappear from this country. A few records of *Vanessa antiopa* have been made from Kent, Sussex, Essex, Hampshire, and the Isle of Wight. These have probably crossed from France, which is rather unusual. One is mentioned as having the border "straw yellow," another with "the border not quite so white." One "with the usual pale border," another "the border is lighter—than that of the usual Continental specimens." It would have been interesting to know the colour of the border in all cases. There have been no captures of *Anosia plexippus* in 1888, but a specimen taken in 1887 in Sussex was recorded last year. It therefore appeared for three consecutive years, 1885, 1886, and 1887. It was most plentiful in the first year. Have subsequent captures been the descendants of these, or has each specimen crossed the Atlantic? If they are the descendants of the 1885 butterflies, they must have found some other food than *Asclepias*. Perhaps the most interesting butterfly record for the year, is the capture by a son of Mr. T. H. Briggs, of a specimen of *Aporia crataegi* at Ramsgate. The species therefore has not entirely left us. No record has been made of the occurrence of *P. acis* or *arion* nor *argiades*. I doubt the two former are quite lost, and that the specimens taken of the latter have been escapes or immigrants, though certainly the circumstances appeared in favour of the species being a true native.

Among the *Sphingidæ*, *Deilephila galii*, of course, stands out pre-eminently. It has occurred both as imago and larva all round the coast, and in many places inland. Perhaps the most interesting thing connected with it, was the discovery of twenty-two larvæ on the Rose Willow herb (*Epilobium angustifolium*) at Risley Moss, near Warrington. I am not aware that it has been found on Willow herb previously. From the number of records made, and from private communications, I would estimate the number of specimens obtained either in the perfect state, or in the larval form, as exceeding one thousand. Other rare Sphinges have been met with. *Cherocampa nerii* was taken on a railway at Poplar on 20th September. *C. celerio* was met with at Reading in Berkshire. *Deilephila livornica*, three captures; one in Cornwall, one in Sussex, and the third in the North of Ireland. *Sphinx convolvuli* has not been very rare, though not so plentiful as in 1887. *Sphinx pinastri* was bred from a larva found near Wimbledon in August or September, 1887. The editors of the *Entomologists' Monthly Magazine*, in commenting on the circumstance say:—"There seems reason to believe that specimens recorded from near Ipswich may be considered British (in the broad sense). Others

(and we think the present one of them) have probably resulted from imported eggs, larvæ, or pupæ. A full-fed larva, that had escaped from confinement, might wander for a considerable distance. An insect that is so abundant on the other side of the Channel as to be considered injurious, should naturally occur here regularly. *S. pinastri* does not. A large quantity of eggs, larvæ, and pupæ are imported annually by dealers and others. The produce of some of these must escape. Everything tends to show that the insect is never, in any case, likely to be destructive here."

The re-discovery of *Zygæna meliloti* not far from its old locality in the New Forest, is particularly satisfactory to those collectors of more recent date who have not been able to obtain it, and who will be glad of the opportunity of adding so interesting an insect to their collections. Whether it is a good species, or only a local form; whether it is the true *Meliloti* of Esper, or an in-bred form of *Trifolii*, it is desirable that every one should have it, now when local variation is so much studied.

Though I have no doubt that *Callimorpha hera* was originally planted in Devonshire for fraudulent purposes, there can be little question, but it is established there now. It does not appear to be numerous, though it is recorded by two collectors last year, and is rather abnormal in its habits. Whether it will die out, or become a permanent resident, the future must decide. What has become of the Mr. Brookes who introduced it to the British entomological world? Since the *Cucullia artemisiæ* episode and *Vanessa callirhoe*, enquiry he has made no public appearance.

Among the Noctuæ, the most important capture appears to be one of *Plusia ni*, a specimen of which was taken last September, by Major Partridge, of the Castle, Portland. He had been out sugaring, and the insect flew to his light and was secured. This species was first taken in England on August 13th, 1869, by the late H. D'Orville, of Alphington, near Exeter. It is recorded in Vol. V. of the *Entomologists' Monthly Magazine*, and in the *Entomologists' Annual*, for 1869. It is figured in the plate of the same work the following year (1870). Mr. Barrett, who named and recorded the specimen, says, "The specimen is a very perfect *Plusia ni*, and a most satisfactory confirmation of the title of the species to be included in the British list." *Plusia ni* is very like a small *Gamma*, and I would advise any one possessing specimens of *Gamma* as small or smaller than *Interrogationis*, to send them to some authority for examination. It is quite likely there may be specimens of *Ni* in some of the various collections in the

country, as it differs more from *Gamma* in size than in other respects. *Laphygma exigua* has occurred near Bideford, and at Colchester. How widely this little rarity appears to be distributed. It may be thought an evidence against the British nationality of some of these Noctuæ that they are so seldom met with, but sugar is not attractive to all the group. The *Plusiæ* rarely or never touch it. I never but once saw a *Dianthea* on it, and there may be particular species in every family that are not to be taken by such means. Light has added to the numbers in our collections of other rarities, but all insects are not attracted by light; and we may yet hit upon some other mode of collecting that will enable us to obtain more of the species still so rare.

Among the Geometers the most important record is that confirming the occurrence of *Acidalia immorata*. It appears to have been first taken by Mr. C. H. Morris, of Lewes, in June, 1887, on some heathy ground near that town. At first they were supposed to be peculiar forms of the female of *Fidonia atomaria*, but further investigation proved them to be new to Britain. Last year it was again met with at the same locality, though a suspicious reticence is observed as to the numbers taken. It is said somewhat to resemble *Strenia clathrata* in appearance and habits, and is placed among the *Fidoniæ* by Berce, under that genus. It feeds on *Calluna vulgaris*, and may occur in other places than that recorded. *Cidaria reticulata* has again been reared, and an interesting note on another page by Mr. Murray, of Carnforth, endeavours to account for its rarity.

I do not propose to speak about the micros other than to observe that it appears *Tortrix piceana* had been taken by Mr. South and Mr. Adkin before Mr. Capper announced its re-discovery. These gentlemen were probably unaware of the importance of their capture.

The Common Snake.

(*Tropidonotus natrix*.)

By W. H. WARNER.

As we naturalists go poking about the hedgerows in the summer time on the look-out for anything in the curiosity line, we are often a little bit startled by catching sight of a thin, greyish-brown body gliding gracefully up the bank, and before we have time to grasp it, disappearing from our view. Timid folks will run away in a great

fright, and even ordinary people with no nerves to speak of will turn a little pale. And yet it was only a poor snake, one of the most harmless of created beings. He was quietly gliding about the hedgerow on the look-out maybe for a dinner, and now, being disturbed by our approach, has betaken himself to his hole at the root of a bush or stump of a tree. Presently, when his alarm is over, he will re-appear, and go hunting around for stray frogs, or, perhaps, stretch out his long, lithe body in sleep in the warm rays of the summer sun.

Old walls, coppices, and such-like places also give shelter to the snake. But its favourite haunts are wet ditches and water meadows, and here in some districts you need never look for one in vain, except, of course, during the winter season. Indeed, the partiality of the reptile for the neighbourhood of water is so great that is often called the "water snake" by the rustics. In this district (North Berks) people profess to distinguish a great difference between the wood-dwelling and the water-hunting snakes; in fact, they consider them to be two distinct species. They say the water snake is dark brown or almost black in colour, and point out other distinctions. I need hardly say that there are not two species.

The snake is common in nearly every part of England, both North and South. In Scotland it is much less abundant, and in Ireland it is not found at all.

The young naturalist may look for his first snake directly the March sun begins to warm the banks and hedgerows. Its favourite haunts in early spring are warm sheltered banks on the borders of woods and copses.

The snake is a great lover of the sun. We remember on one occasion watching the movements of a snake in a small coppice. This individual seemed to be living all by himself in a small hole at the roots of a spreading spruce fir. He made his way into this hole, head first, and after a time peered out again, finally drawing himself out of the hole, and gliding to a sunny spot, where he lay at full length, and took a quiet nap. So soundly did he sleep that we had to give him a most decided poke with a stick before we could rouse him.

We have already spoken of the snake's attachment to watery situations. When strolling on the banks of streams we have on several occasions come upon snakes fast asleep close to the edge of the water, and on our approaching them they have slid down the bank and plunged into the water without the slightest hesitation, swimming easily and gracefully in an eel-like fashion. Again, one afternoon (June 26th, 1886) when fishing by the river Thames, a small

snake came wriggling and gliding along the top of the water from the opposite side, and, passing close by my line, made its way up the bank. So thoroughly is the snake at home in the water that it will often sink to the bottom, and remain there a considerable time.

The snake is often to be seen gliding about the hedgerows, and those who would like to see the very perfection of flexible motion should certainly pause a few moments if they happen to come upon our snakey friend wriggling his way up the bank. The lithe, slender body of the snake is capable of being turned in any direction, even held bolt upright, and, by erecting its scales stiffly, it can climb an almost perpendicular bank.

As the snake glides slowly along, with protruding and quivering tongue, it is on the look-out for prey, and woe to the unlucky frog it happens to come across in its investigations of the holes and crevices.

Of the manner in which the snake treats a frog when it happens to meet with one, that pleasantest of naturalists, the Rev. J. G. Wood, thus informs us:—"I was once walking in a field, and heard a strange cry from a neighbouring ditch. On going towards the spot I saw there a large snake struggling with a frog. The frog was comparatively as large as the snake, and, as it had a plain objection to being swallowed, there was some turmoil. The snake was stretched along the bottom of the ditch, which at this time was dry, and he held in his mouth both hind-feet of the frog, which was also stretched forward at full length, resisting with its fore-legs the attempts of the snake to draw it back, and croaking dismally. The strife continued for some time, when I made a sudden movement, and the snake, loosing its hold of the frog, glided up the opposite bank. The frog slowly gathered itself together, sat still for some time, and then hopped away." To this we add that but for Mr. Wood's appearance poor froggy would doubtless have been soon gulped down alive, and consigned to a living tomb.

To retain such a wet, slippery customer as a frog, the snake has two rows of small teeth inside the mouth, specially adapted for the purpose—the tips being recurved or turned back towards the swallow. Consequently Mr. Frog is most decidedly taken in and done for if he happens in his rambles to meet with a *Tropidonotus natrix*.

Frogs, I believe, are the favourite food of the snake. For these it will search both in the water and on land. In 1881, according to the *Field*, an angler, when fishing in the river Witham for perch, hooked a snake thirty-four inches in length, which had taken a fancy to his bait—a small frog. According to a correspondent of the *Zoologist*,

snakes have been killed which contained two frogs, the upper one (that is the one last swallowed) being still alive, and apparently very little the worse for its adventure.

I always believed till one day in August, 1871, that no animal was less liable to fall a prey to gluttony than the common toad, having many a time come upon the uneaten carcase of the poor creature lying by the roadside totally neglected, except by that insect grave-digger, the burying beetle (*Necrophorus vespillo*). Who ever knew the body of any other animal to remain so long unburied as that of the toad? On the day in question I was out for a ramble, and on passing a small coppice I came suddenly upon a large snake and a half-grown toad together near a wall. The snake soon made its escape, leaving the poor toad behind in a sadly bewildered state. It seemed fascinated. Its hind-legs were stretched out sideways in the most curious fashion, and the whole front part of its body, and a good way down its back, was literally smeared with a slimy fluid, as if it had been swallowed thus far. It remained immovable for some time, but at length as it were, collecting its faculties, it moved a little, and then slowly crawled away, disposing its fore-parts in a hole of the wall, close to where the snake had gone in.

The above incident, on being inserted in *Science Gossip*, brought several replies, conclusively proving that toads, if they happen to come in the way of snakes, stand an extremely good chance of being swallowed there and then. I also received two interesting letters on the subject from a Somersetshire clergyman, extracts from which I will give, though they have already appeared in the above magazine:—"I have never caught snakes in the act of doing so (*i.e.*, swallowing toads), but I have several times seen them disgorge toads in various stages of decomposition. I particularly remember one occasion, when more than a mile from home, I caught a snake, which I saw had very recently swallowed its prey. I took it home, and placing it on the lawn began to tease it with the intention of making it disgorge its meal. It immediately began to strain, and the protuberance in its body moved slowly towards the head, each strain advancing it a short distance. At length the jaws opened, and first one fore-leg, then the head, and lastly the whole body of a toad was gradually ejected. After remaining in *statu quo* for a few minutes, the toad showed some signs of life, and the limbs slowly regained their proper position. It wiped off the slime from its face and head, and then crept slowly away. The disgorging is a curious process well worth watching by those who take an interest in such matters."

In another letter the same gentleman says :—" I believe the toad is the natural food of the snake, quite as much so as the frog ; in fact, I have seen more toads than frogs disgorged by snakes. It has been only when teased (as described in my previous letter) that the snake has endeavoured to get rid of its prey, for the purpose, as I conclude, of enabling it to move more rapidly away. I once teased a young viper, about nine inches long, in the same way, and it threw up the body of a lizard (minus the tail) which had not been swallowed long."

A few weeks ago in course of a conversation with an intelligent gamekeeper of my acquaintance he informed me that he had once found a toad in rather a curious place. He had killed a snake, which, being very big in the middle, he out of curiosity cut open, and by this means released a toad, which, after a time crawled away, to all appearance very little the worse for its temporary sojourn in the body of its snaky enemy.

White, of Selborne, also says that snakes eat toads.

Another favourite morsel much relished by the snake is the newt. To obtain these creatures the subject of our sketch will dive to the bottom of ponds and pools. It will also search for them on land. To-day (July 14th, 1873) a snake was killed close to this house by some children, who on cutting it open found a large and live warty newt (*Triton cristatus*) in its stomach. The snake had evidently been traversing a wall for the little reptiles. The snake has also been known to take fish, and to chase a brood of ducklings in the water. It digests its food very gradually.

The subject of "snake fascination" over birds, is one about which we do not care to give an opinion. We have never seen an instance ourselves. In the act of "fascination" the snake is said to lie coiled up and quite motionless, with head erect, neck swelled out, and eyes bright and glittering. The steadfast stare of the reptile, like that of the wily fox in the hen-roost, is supposed to be the decoying or fascinating power.

Two or three times in the course of the year the snake finds its outside garment fitting somewhat too tightly for comfort, and, therefore, makes arrangements for getting rid of it. To this end it entangles itself among the grass or heather, and proceeds by wriggling and twisting to disrobe itself. The skin first bursts about the head and neck, and the reptile thrusting back its old skin crawls out. The cast-off, commonly called the "slough," is often found lying in the haunts of snakes, and is frequently seen hanging up in the labourer's cottage as an ornament. Sometimes these "sloughs" are marvel-

lously perfect, even to the skin covering the lips and eyes. The last one picked up by me on a neighbouring heath measured thirty-four inches in length, and was a really beautiful object. Of course, the markings of the previous owner are not to be seen on the "slough," the latter being semi-transparent.

The snake, I need hardly say, is a very inoffensive reptile. Let anyone approach its haunts, and the timid creature will be seen gliding rapidly away. Its only method of defence is to throw out a very strong and pungent scent, which is said to adhere most tenaciously to the hands and the clothes. I have never yet succeeded in making the snake exhale this odour; the reason probably being that I have not irritated the poor reptile sufficiently to cause it to throw out the scent. It is only when irritated that the snake gives out this odour.

Though a very inoffensive creature, the poor snake has many enemies, the principal being man; but it is also devoured by hedgehogs, polecats, weasles, and hawks. I have also a note in my diary of a large snake having been found in the nest of a barn owl (*Strix flammea*) in a hollow tree. This was curious, as the rambles of the diurnal and sun-loving reptile are generally taken at a time when the nocturnal freebooter is snoring and blinking on his perch in the old barn or hollow tree. Perhaps, however, the snake was already dead when found by the owl.

People in Berkshire attribute most marvellous tenacity of life to the snake. They solemnly assure you that it is a matter of impossibility to kill the snake till the sun goes down, and that, though cut into a thousand small pieces, it will not relinquish the spark of life till sunset. This profound assertion needs a great deal of confirmation.

In July and August the snake deposits its eggs in brick-kilns, manure heaps, and other similar places, leaving them to be hatched by the warmth of the situation. The egg is yellowish white in colour, and about the size of a large filbert. It has no shell, but is covered with a wet parchment-like membrane. The eggs are deposited in masses, but when pulled apart are in the form of long glutinous chains. Their number is from sixteen to twenty. On opening one of these eggs we find it full of "white," except in the centre, where there is a "globule of blood, on washing away which the embryo snake may be seen coiled up like a watch-spring."

Snakes are often gregarious at the breeding season, many individuals resorting to a favourable "snakery." In the summer of

1872 several bushels of snake eggs were found in a saw pit at Hermitage, Hungerford, Berks, and in ten days time there were destroyed in this pit about one hundred and fifty snakes and eleven slow worms (*Anguis fragilis*).

Snakes hybernate during the winter in hollows at the roots of trees, in banks, and under masses of foliage, and stacks of faggots in woods. At this time they have been found in company with vipers, all coiled together.

The following is a description of the common snake :—A full-grown snake will measure three feet in length ; occasionally it has been known to reach four feet. The upper parts are usually of a greyish-olive, with a greenish tinge, with two rows of small black spots along the back, and some black spots or blotches along the sides. Behind the head are two bright yellow spots, followed by two black spots or beads. Underneath it is of a lead colour, occasionally mottled with greenish yellow. The ground colour varies considerably, sometimes being dark and sometimes very light, with the markings deep black. The snake may easily be distinguished from the other species by the two bright yellow spots behind the head, which are distinctly visible as it glides along. The scales on the head are few and large. The tail ends in a tapering fashion, differing in this respect from the viper or adder, whose tail terminates somewhat bluntly.

Fyfield, Abingdon. December, 1888.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

December 5th, 1888.—DR. D. SHARP, F.L.S., President, in the chair.

Mr. B. A. Bower, of Eltham, Kent, was elected a Fellow of the Society.

Mr. W. F. Kirby exhibited, for the Rev. Dr. Walker, a variety of the female of *Ornithoptera Brookiana*; he also exhibited, for Major Partridge, an undetermined species of the genus *Hadena*, captured last summer in the isle of Portland.

Mr. R. South exhibited a series of specimens of *Tortrix piceana*, from a pine wood in Surrey; also melanic forms of *Tortrix podana*, from St. John's Wood.

Prof. Meldola exhibited, for Dr. Laver, a melanic specimen of *Catocala nupta*, taken last September at Colchester.

Mr. E. B. Poulton exhibited preserved larvæ of *Sphinx convolvuli* showing the extreme dark and light forms of the species.

Mr. M'Lachlan called attention to a plate, representing species of the genus *Agrotis*, executed by photography, illustrating a memoir by Dr. Max Standfuss, in

the Correspondenz-Blatt, Verein "Isis," in Dresden, in 1888. He considered it was the best example of photography as adapted for entomological purpose he had ever seen, especially as regarded its stereoscopic effect.

The Rev. Canon Fowler exhibited a specimen of *Mycterus curculionoides*, L., sent to him by Mr. Oliff, and taken by Mr. Gunnting near Oxford about 1882.

Mr. W. Nicholson exhibited several extraordinary melanic varieties of *Argynnis niobe* and *A. pales*, collected by himself last summer in the Engadine.

Mr. J. H. Leech exhibited a small collection of Lepidoptera formed last year by Mr. Pratt at Kiukiang, Central China. It included several new species, also specimens of a variety of *Papilio sarpedon* and other interesting forms.

Mons. A. Wailly exhibited a collection of Lepidoptera lately received from Assam, containing upwards of thirty-five species of *Papilio*, *Ornithoptera*, *Charaxes*, *Diadema*, *Cyrestis*, and other genera.

Mr. Meyer-Darcis exhibited specimens of *Sternocera tricolor*, Kerr, and *S. variabilis* Kerr, from Lake Tanganyika; also two new species of *Fulodis* from Syria.

Mr. F. Merrifield exhibited, and made remarks on, a long series of *Selenia illustraria*, *S. illunaria*, and *E. alniaria*, in illustration of his paper on "Pedigree Moth-breeding."

Lord Walsingham exhibited, and made remarks on, a series of species representing the genera *Snellenia*, Wlsm., *Edematopoda*, Z., and *Eretmocera*, Z.

The Rev. T. A. Marshall communicated a paper, entitled "A Monograph of British *Braconidæ*. Part III."

The Rev. Dr. Walker communicated a paper, entitled "Description of a variety of the female of *Ornithoptera Brookiana*."

Lord Walsingham read a paper, entitled "A Monograph of the genera connecting *Tinageria*, Wlk., with *Eretmocera*, Z." A discussion ensued, in which Mr. Stainton, Dr. Sharp, and others took part.

Mr. Merrifield read a paper, entitled "Incidental Observations in Pedigree Moth-breeding." This paper contained a detailed account of experiments with *Selenia illustraria*, *S. illunaria*, and *E. alniaria*, which, so far as they had yet proceeded, indicated that retardation of development in the growing stages of the larvæ, as well as in the pupal stage, was the cause of the darkening of colour in the perfect insects; that a low temperature had the effect of causing such retardation; and that growing the larvæ at a forcing temperature tended to produce a warmer and yellower tint in the colouring of the moths. Lord Walsingham, Mr. Poulton, Prof. Meldola, Mr. White, and Mr. Merrifield took part in the discussion which ensued.

Mr. J. H. Leech read a paper "On a small collection of Lepidoptera from Kiukiang." Captain Elwes said he had examined this collection with very great interest, and was struck with the similarity of many of the species to those from Sikkim.—H. GOSS & W. W. FOWLER, Hon. Secretaries.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

November 15th, 1888.—The Vice-President in the chair. Mr. Battley exhibited a fine specimen of *A. atropos*, and a living specimen of *D. fagella* (an unusual circum-

stance for the time of year). Mr. Hockett, a specimen of *P. unguicula*, which, he stated, had emerged on November 8th, and was the only one he had as yet bred, from a batch of ova obtained in the spring of this year; furthermore, he thought it probable that the remainder of the brood would not appear until next season; he attributed the absence of the insect during the summer to the cold weather prevailing at the time at which it usually appears; and that the specimen he had bred was doubtless enticed out by the recent very mild weather. Mr. Hanes, a series each of *E. tiliaria* and *E. fuscantaria*. Mr. Lusby, a series of *D. cæruleocephala*. Mr. Jarvis, a series of *Tachinus subterraneus*, *Tychius polylineatus* (from Ventnor), and *Cryptocephalus aureolus*. Mr. Lusby, a specimen of *Clytus arietus*, and a section of wood showing ravages of the larvæ of this beetle. Mr. Pearson remarked that he had recently taken a larva of *N. camolina*, and as he had also taken it earlier in the year, he thought there must be two broods, although but one was recorded by Stainton. Mr. Hanes stated that he had taken the imago of this moth in May, June, and September, and the larvæ in July and November; he also considered that there were two broods of this species.

December 6th, 1888.—The Vice-President in the chair. Mr. J. A. Clark exhibited a series of *L. lobulata*, and a remarkable variety of *O. dilutata*. Mr. Hanes, a series each of *A. lunosa* and *H. proteus*. Mr. Battley presented eggs of the Skylark and Black-headed Bunting to the Society. Mr. Hockett remarked that since the last meeting he had bred 20 specimens of *P. unguicula*, 3 of which had emerged on that day. Mr. May had found about three dozen larvæ of *P. brassicæ* feeding, only a few days ago, at Northfleet. Mr. Hanes had recently noticed a half-fed larva of *P. bucephala* wandering on a fence, evidently in search of food, the trees at that time being completely bare. Mr. Hollis mentioned that he had a larva of *O. sambucata*, which had just gone into pupa. Mr. Clark had bred a specimen of *T. orbona* on Dec. 3rd. Other members also remarked upon the unusual season. Mr. Clark stated that a portion of a thigh bone of some gigantic extinct animal (probably the Mastodon), had been dug up at Hackney; the bone measured 4 feet 8½ inches in length.

This being the annual meeting, Mr. Russell then read the report. It appeared therefrom that the Society had made considerable progress since their removal to London Wall; several new members had been enrolled; a cabinet for birds' eggs had been acquired, and many donations had been made towards this collection, representing now about 80 species. Fourteen papers were read on various subjects during the year, the best of these being that by that Mr. J. A. Clark, on "*Cossus ligniperda*." The exhibits had been of a highly interesting character, comprising nearly all branches of natural history, and many donations were made to the Society's entomological collections.

The following gentlemen were elected as officers for 1889:—President, Mr. Cooke; Vice-President, Mr. Hockett; Treasurer, Mr. J. A. Clark; Curators, Messrs. Gates and Bellamy; Librarians, Messrs. Gurney and Jarvis; Members of the Council, Messrs. Battley, Golthwaite, Newbery, Phipos, and Russell.—G. A. LEWCOCK and EDMUND HANES, Joint Hon. Secretaries.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

November 22nd, 1888.—JOHN T. CARRINGTON, Esq., F.E.S., Vice-President, in the chair. Messrs. W. G. Dawson, F. E. Brown, A. Marshall, and J. Katz, were elected members. Mr. J. Jäger exhibited *Agrotis præcox*, from Glamorganshire, obtained by shaking the sand crests, dark forms of *Acidalia marginepunctata*, from South Wales, *Cidaria reticulata*, from the Lake District, and *Lobophora viretata*, from Staffordshire. Mr. E. B. Nevinston, *Lucania putrecens*, South Wales, *Acontia luctuosa*, Surrey, two dark forms of *Heliothis peltigera*, one taken on the 15th and the larva of the other on the 18th August, which produced an imago on the 17th September. Mr. R. Adkin, *Pieris napi*, from West Ireland, approaching variety *bryonia*, *Ellopiæ fasciaria*, from English and Irish localities; *Fidonia atomaria*, *Larentia didymata*, *Eupithecia nanata*, and *Ypsipetes elutata*, from English, Irish, and Scotch localities. Mr. Tugwell, two specimens of *Margarodes unionalis*, taken in 1877, at Kingsdown, Kent, off flowers of *Eupatorium cannabinum*, two examples of *Mecyna polygonalis* both taken in 1877, one at Deal the other at Kingsdown; a series of *Eupithecia extensaria* from Kings Lynn, and *Acidalia immorata* from Lewes, and made some observations upon his exhibit. Mr. Henderson, examples of the second brood of *Tephrosia crepuscularia* from Oxfordshire. Mr. Hawes, ova of *Bombyx neustria*, clustered round the stalk of a plum tree. Mr. West (Streatham), *Polia chi* from North Wales.

December 13th, 1888.—T. R. BILLUPS, Esq., F.E.S., President, in the chair. Messrs. G. Tindall and M. Winkley were elected members. Mr. Frohawk exhibited the specimen of *Vanessa antiopa* taken by him at Chatham; together with German and American examples of the species. Mr. R. Adkin, on behalf Mr. Austin, a pale, fawn coloured variety of *Epinephele ianira*; a strongly marked example of *Cenonympha pamphilus*; blue forms of the male and female of *Lycana adonis*; and an under-side of the male, with dark gray ground colour and the usual spots being absent; also pale, xanthic, and gray forms of *Bryophila perla*, all taken at Folkestone. Mr. Carrington, a strongly-marked variety of *Vanessa C-album* taken near Droitwich. Mr. Adye, unusually large and small forms of *Selenia illustraria* and *Metrocampa margaritaria*. Mr. J. T. Williams, *Acidalia immorata*, Lewes; *Deiopeia pulchella* from Southbourne, 1876; and *Cymatophora or* from the Hebrides. Mr. Heeps, *Ptilophora plumigera* (bred). Mr. R. South, British and foreign examples of *Dianthæcia* allied to *D. nana*, and contributed notes thereon; a discussion ensued, Messrs. South, Carrington, Gregson, Tugwell, and others taking part. Mr. R. Adkin exhibited series of *D. nana* from Kent, Surrey, Shetland, and the Hebrides; and Mr. Hall, series of many species of *Dianthæcia*. Mr. South also exhibited a form of *Gortyna flavago* from Perthshire, and made some observations thereon. Mr. W. H. Tugwell, forms of *Ypsipetes elutata*, bred from larvæ obtained from Huddersfield; *Agrotis simulans*, Aberdeenshire; and *Nemeophila plantaginis*, var. *hospita*, from Forfarshire. Mr. Manger, *Dynastes hercules* from Montserrat; *Chalcosonia atlas*, *Megalosonia thesus*, and a species of *Golofa*, which was not identified, all from Brazil. Mr. Billups, 50 species of *Chrysomelidæ* from various parts of the world. Also some specimens of *Miaris micros*, Germ., taken by Mr. West in Headley Lane, by sweeping, in the year 1884.

Mr. West said that when he took this species it was extremely abundant, but he had not been able to find it since. Mr. Billups also exhibited *Hotinus clavatus* taken by Mr. Elwes at Dargeeling, 1886. Mr. Billups also exhibited male and female specimens of the minute mussel crab (*Primothereus pisum*). Mr. Carrington making some interesting remarks on the economy and habits of the crustacean, Mr. Jenner Weir said it could be found commonly at Brighton. Some observations were made on the number of plants to be seen in bloom at the present time, consequent upon the mildness of the weather.—H. W. BARKER, Hon. Secretary.

Notes and Observations.

LIPARIS DISPAR.—All my pupæ have died, as I anticipated (*vide* Y.N., vol. ix., p. 229). They shrivelled up about a fortnight after I brought them indoors. If I had waited till the weather was cold and frosty I doubtless should have succeeded, but as it was, the humidity of the atmosphere prevented the heat having due effect, and developing the imago in the pupa at once, as it would doubtless have done had the weather been cold. Mr. Buckler, in his "Larvæ of British Butterflies and Moths," vol. ii., page 32, comes to the same conclusion as this with regard to forcing pupæ of *D. euphorbia*. I am very sorry to have lost this brood, as it was, I believe, of British extraction, and has been in the possession of the late Henry Willis, of this town, and myself for over 14 years.—A. E. HALL, Norbury, Sheffield.

CIDARIA RETICULATA.—I have come to the conclusion that *Cidaria reticulata* is so rare an insect owing to the larva feeding so late in the autumn on a food plant so tender as *Impatiens noli-me-tangere*. The larvæ is also very petted. I could never get it to eat any other plant, and I would not at all be surprised if this species soon became extinct, owing to the early frost and snow we have. This season we had it on the first day of October. I have never been able to make much out with the larvæ, although I have tried hard, and have gone almost daily for fresh food for them. I was successful in breeding it this season. Knowing the larvæ made up amongst the loose rubbish, and that it did not wander much, I determined to try another plan. I went late in the season and collected bags of rubbish from about where I knew the plants had been growing, and was rewarded by a very nice series. I am afraid it will be no use trying the same this winter, for I went on the 28th of September to see if there were many plants. I found my corner had a nice bed in it, and I had a good look for larvæ. I found three, but not nearly half grown. Being so small,

I placed them on a marked plant, and left them. The frost and snow coming a few days later, I went up again at once, and found the plants all withered to the ground. After some looking I came across two larvæ wandering about. Not knowing what to do with them, I came to the conclusion to send them to the Rev. B. Smith, of Marlow. He had intimated to me that he could not but think that the larvæ might be got to eat something else. I have had a note from the Rev. gentleman since to say he made nothing out. I can see but one chance for *Reticulata*, which is if any stay more than one year in the pupa. If not, I do not see how they can survive, and should be sorry to lose sight of so grand a species. I also was fortunate in breeding a very nice series of *P. postrema* this season from the same plant.—H. MURRAY, Lowbank Villas, Carnforth.

NOTE ON EUBOLIA CERVINATA.—This species was common here formerly, but the food, common mallow (*Malva sylvestris*), is so hunted by the herbalists, who call it marsh mallow, that it is quite scarce now. I found five larvæ on one plant this year. From these I bred three moths together, two females and one male. These were shut up together for two or three days, but I never noticed them pair. They had done so evidently, for *both* females deposited ova. I have now had these above three months, and they all appear fertile. The other two larvæ produced female moths nearly a fortnight later, but the male was dead.—JOHN E. ROBSON, Hartlepool.

TACHINUS SUBTERRANEUS.—This insect has been rather common in the North London gardens this autumn, and also *Choleva fusca*. I find them principally among dead leaves and decaying vegetable heaps, likewise under stacked roots of *pyrethrum*.—G. A. LEWCOCK, 73, Oxford-road, Islington.

AN ANCIENT EGG.—During some repairs to Middleton-on-the-Hill Church, near Leominster, the old plaster was removed from the inside walls, and a number of scaffolding holes were exposed to view, filled up with loose stones, dirt, and other rubbish. As, in all likelihood, they had never been uncovered since the building of the Church, which took place between the years 1000 and 1100, a search was made in them all, in the hope something interesting might be found. But the only thing brought to light was an egg, lying at least two feet from the mouth of the opening, which space was quite full of loose rubbish, so that no bird could have got to the back of it, even if the plastering had been done in more recent times. The egg is much discoloured, and is perforated by numerous tiny holes, through

which the yoke, &c., filtered in fine powder, when the shell was shaken. The egg is, I believe, that of an owl, but is a little smaller than any I have seen. No spots or markings can be discerned with certainty, and doubtless the shell was pure white when laid. The tower of Middleton Church (of which my father is Vicar) has walls six feet thick, and outside it is covered with an enormous tree of ivy, which clasps it on three sides to the top. The building is in sad need of restoration, but a good deal has been done lately to stop further decay. It would interest me to learn if any reader of the *Young Naturalist* knows of a similar case of an egg being buried so many years.—(Miss) E. HUTCHINSON, Grantsfield, Leominster.

The Classification of Coleoptera Historically Considered.

By W. E. SHARP.*

In any general consideration of the component entities of organic nature, what strikes us as perhaps the most salient and most important fact of their being, is that capability of arrangement in ordered graduation which they exhibit and which has been recognized since first the attention of mankind was directed to their observation; that every creature in which is the breath of life, from the lichen which encrusts the primæval granite, and the nomad which vivifies the drop, up to man, has its place in an ordered whole, bears relationship and affinity to its fellows and is approximated more or less closely to a possible typical conception. This is a quality which has elevated the study of nature from a recreation to a science, and has for thoughtful minds of every age invested it with a deep and mysterious significance, long before it became possible to establish on such premises, the greatest generalization of modern times. And it is because this possibility of classification afforded by creation, and this power of seeing it evinced by the human mind, seems to me to be of considerable importance and interest, that I have asked your attention to its manifestation in a very small section of the articulate division of the Animal Kingdom, and attempted to trace, how the conception of approximated affinities in one order of the class *Insecta* has originated,

* A Paper read before the Lancashire and Cheshire Entomological Society.

and how it has been modified and altered by more extended knowledge and wider experience.

I have chosen the class *Insecta*, because it appears appropriate to the Society which I have the honour to address, and the order *Coleoptera*, because that order has had more attention devoted to it by the older entomologists, and is perhaps more homogeneous and more strictly limited than most of the others. Since Entomology was first treated as a serious study, this order has been well defined, its members have been recognized as all of one household, and have not, as in the case of some of the less specialized insects, been united now with one, now with another, of the fluctuating groups into which various systematists have divided the *Insecta*.

With the exception of the loose classification of Geffrey, the bounds of this order have only been relaxed, or the patronymic of any of its groups disputed, so far as I am aware, in the case of *Forficula* (or the Earwigs) not unnaturally classed by some of the earlier systematists as connected with the *Brachelytra*, and more recently in the case of *Strepsiptera*, which I believe are now generally admitted as aberrant members of the order.

Within the limits of the group, however, many changes have taken place, and it is to a short summary of these that I propose to draw your attention.

Among the ancients the study of nature held no very high place, and in an age when art rose to an eminence to which we now vainly strive to attain, we are only able to discover the first faint glimmerings of any desire to penetrate the arcana of natural phenomena. Philosophy was indeed so subordinated to metaphysics, that truth was lost in theory. Such philosophers as Democritus and Lucretius had their tenable hypothesis of the visible creation, but the simple unbiassed investigation of nature was neglected or utilized merely to prop up some kosmic theory of the universe. Among all the great minds of Greek civilization, Aristotle is the only name which we can call in any sense that of a naturalist, and to the great Stagirite the world owes not only its first knowledge of natural phenomena, but the very foundation of the inductive sciences.

But Aristotle's claim to be considered as a systematist is a small one. Many people regard him as such, but although he distinguished between different kinds and groups, indeed giving to the very order we are now considering the distinctive name which it bears to-day, yet he seemed to recognize no ordered sequence in their differentiation, and his works on animals consist chiefly of a mass of heterogeneous

and often entirely erroneous observations and assumptions. Professor Agassiz says of him, "His work shows a total absence of systematic form or any classification or framework to express the division of the animal kingdom into larger or lesser groups." And the learned Whewell writes, "He never had a system proper; although he saw the necessity of one, he failed to indicate it." But Aristotle's claims are still considerable. He was the first to understand and express the principle of homologues and homologous growths, that is that principle by which we assert that the wing sheaths of a beetle or the balancers of a *Tipula* are to be considered really as wings, although they bear no external objective resemblance to those organs, but only a subjective mental one. His remarks, too, on correlated growths are acute and interesting; in fact Aristotle, although no systematist, was undoubtedly a naturalist in the best sense of the word, the first and only one so far as we know of the classic world, and it was in this character that for long centuries after his death he was revered by scholars and thinkers as little less than divine. And in that ancient world he had no peer. Pliny cannot be considered as more than a collector and recorder of unorganized fragments of knowledge; and after the fall of the Empire we fail to catch one ray of any new light through all the ages—well called dark. The culture which the classic nations bequeathed to Europe was purely human, and the sphere of nature was regarded during the first fifteen centuries of the Christian era as subject to no laws capable of investigation, and involved in a mystery which it was impious as well as useless for the mind of man to attempt to fathom. The Church, all powerful in its empire over the mind, carefully discouraged and repressed all tendency to scientific inquiry. But with the Renaissance, the minds of men released from the fetters of ages, expanded vigorously into new channels in the pursuit of truth. Nature assumed a new guise, and nothing in the heavens above or in the earth beneath, appeared too great or too small for the penetrating reach of human intellect. We find a Swiss, one Conrad Gesner, born in 1516, the first child of the new age who turned his attention to the study of nature. An indefatigable writer and observer, he published several extensive works on the Vertebrata in his own lifetime. The result of his studies of the Articulata saw the light many years after his decease, in the work of the English Mouffet, published in 1634, about a century after their origin; but we can hardly class either Mouffet, or any other writer of 17th century, that is before Ray, as in a strict sense a systematist. The study of entomology was in its infancy, and naturally required

the labours of many observers in recording facts before a sufficient basis of knowledge was obtainable on which to found any system at all. As an example of this want, we may cite the singular classification of Antonio Vallisnerri, early in the 17th century. This ingenious systematist divides all insects as follows:—

1. Insects that live on plants.
2. Those that live in water.
3. Those that live among stones.
4. Those that devour flesh.

The crude result of theory unsupported by detailed observation is here apparent.

But among the few observing entomologists of this period, two names merit our notice more especially, they are both those of Dutchmen. Goedart published his first work "Metamorphosis Insectorum" in 1662, this most interesting book with its careful plates engraved by the author himself, deals principally with life histories and descriptions; the author does not attempt much classification and only describes 19 beetles altogether. A name that is more familiar is that of Swammerdam who may fairly be placed in the first rank of naturalists. His laborious investigations into the economy and anatomy of Insects, Crustaceans, and Mollusca, considering the slender and often erroneous records he had to work upon and the rude instruments in his power, are simply marvellous. His great book the "Biblia Naturæ" was published in 1658, and contains the most elaborate descriptions copiously illustrated by plates, of all kinds of insects and crustaceans. The system of classification adopted by Swammerdam, if system it can be called, was based on the pupa or nymph as he called it; it is decidedly interesting and shows a considerable advance on his predecessors. He divides all insects, which in his time was an appellation much more comprehensive than it is now, into two major groups:—

1. Without metamorphosis, under which heading come Arachnida, Myriapoda, and Entomostacæ.

2. With metamorphosis, which includes all the true insects.

No. 2. division is again split up into three minor groups according to shape and movements of pupæ.

The first division has pupæ which are locomotive and articulated, of this are Orthoptera, Neuroptera, Hemiptera.

No. 2 has an articulated pupa, but a motionless one, including Lepidoptera, Coleoptera, and most of the Hymenoptera.

No. 3 has the pupa vermiform, that is without visible limbs, and

motionless. The Diptera and some of the Hymenoptera form this division.

You observe that the formation of such a classification as this implies considerable study of insects in all their stages. Swammerdam describes rather less than 250 species of beetles, but they are difficult to identify, and, on account of the paucity of his materials, he was unable to undertake anything like a systematic classification of them. Swammerdam died in 1685, and in 1710, 50 years after the appearance of that naturalist's great work, there was published by the Royal Society of London, shortly after the death of its famous author, Ray's "*Historia Insectorum*." John Ray is really our first systematist. As voluminous almost as Swammerdam, he took in a wider sphere, and his work on insects was almost the last labour of a life devoted to the study of all natural phenomena. The son of an Essex blacksmith, the obvious bent of his mind, induced his father to send him to Cambridge, he became a Fellow of Trinity, took orders, although he never had a cure, and became the first naturalist of Europe. To his works on plants, birds, &c., we will not refer, but direct our attention briefly to his classification of insects, in which he was aided by the learned Willoughby. Coleoptera are considered in this system to rank equivalent to Lepidoptera, Hymenoptera, and Diptera all combined.

Ray says of the special order we are considering, viz., Coleoptera, that it can be classified in three different ways. By general appearance, or as he puts it, for his work like most scientific treatises of that period is in Latin "*Commune respectu*"; secondly by their Antennæ or, thirdly, as he rather vaguely says according to their movements."

He specifically describes about 100 species, more than half of which seem to be Lamellicornes. *Cicendela* figures as the glow-worm, which indeed was the insect originally called by that name, its transference to the tiger beetle being due to Linnæus, there are very few Geodephaga and only one Brachelytra described, but like Swammerdam before him, he was able to study too few forms to make any lasting classification of the Coleoptera.

But two years after the death of Ray, in 1707, there was born in the village of Rashult, in Sweden, a child whose life-work originated a new era in natural science. I refer to Karl Linnè, or as we call him Linnæus. The great Professor of Upsala displayed when a boy few signs of the mental power he afterwards developed; he travelled a great deal in Sweden, Finland, and all over Europe, and settled for a long time in Holland before he received a British knighthood and



SYSTEM OF RAY.

1705.

| | | | | |
|-----------------------------|---------------------------------|--|--|---|
| <p>AMETAMORPHOTA</p> | <p>APODA</p> | <p>WORMS</p> | <p>TERRESTRIA</p> <p>AQUATICA</p> | <p>PEDICULI</p> <p>PODURÆ, &c.</p> <p>FISH LICE, &c.</p> |
| | <p>PEDATA</p> | <p>HEXAPODA</p> <p>OCTOPODA</p> <p>14. PEDATA</p> <p>POLYPODA</p> | <p>CAUDATA</p> <p>NON-CAUDATA</p> | <p>SCORPIONS</p> <p>SPIDERS</p> <p>ACARI</p> <p>LAND CRUST- ACEANS, WOODLICE &c</p> <p>JULUS, &c.</p> |
| <p>METAMORPHOTA</p> | <p>PARTIAL METAM.S.</p> | <p>NEUROPTERA</p> <p>HEMIPTERA</p> <p>ORTHOPTERA</p> <p>DERMAPTERA</p> | | |
| | <p>COMPLETE METAM.S.</p> | <p>COLEOPTERA</p> <p>ANELEYTRA</p> | <p>LEPIDOPTERA</p> <p>HYMENOPTERA</p> <p>DIPTERA</p> | |

LINNÆAN SYSTEM.

COLEOPTERA.

1767.

1. ANTENNÆ CLUBBED

| | Number of Species in Genus. |
|------------------|-----------------------------------|
| SCARABÆUS - - - | 87 |
| LUCANUS - - - | 7 |
| DERMESTES - - - | 30 |
| HISTER - - - | 6 |
| BYRRHUS - - - | 5 |
| GYRINUS - - - | 2 |
| ATTELABUS - - - | 13 |
| CURCULIO - - - | 95 |
| SILPHA - - - | 35 |
| COCCINELLA - - - | 49 |

2 (continued)

| | Number of Species in Genus. |
|-------------------|-----------------------------------|
| MELÖE - - - | 16 |
| TENEBRIO - - - | 33 |
| LAMPYRIS - - - | 18 |
| MORDELLA - - - | 7 |
| STAPHYLINUS - - - | 26 |

3. ANTENNÆ SETACEOUS

(Bristle like)

| | |
|-----------------|----|
| CERAMBYX - - - | 83 |
| LEPTURA - - - | 25 |
| CANTHARIS - - - | 27 |
| ELATER - - - | 38 |
| CICINDELA - - - | 14 |
| BUPRESTIS - - - | 29 |
| DYTISCUS - - - | 23 |
| CARABUS - - - | 43 |
| NECYDALIS - - - | 11 |
| FORFICULA - - - | 2 |

2. ANTENNÆ FILIFORM

(Thread like)

| | |
|------------------|-----|
| BRUCHUS - - - | 7 |
| CASSIDA - - - | 31 |
| PTINUS - - - | 6 |
| CHRYSOMELA - - - | 113 |
| HISPA - - - | 4 |



the chair of Natural Science at the Swedish University. The general aim and scope of the works of Linnæus are so well known that it will be needless to refer to them in detail. Of course the "Systema Naturæ" was his *chef d'œuvre*, and the work that has immortalized his name. A first edition of fourteen folio sheets was published in 1735, and new and fuller editions were issued at intervals over a space of some thirty years.

Without referring to the Linnean method of arrangement in other departments of nature, we will briefly examine his Entomological and more especially his Coleopterous system. His orders of insects were divided by wing characteristics, and roughly correspond to these now accepted. You must remember that although several authors had previously classified insects as a whole, no one had attempted to classify each order in anything like a comprehensive manner. You will observe the coleoptera here are divided entirely by the antennæ into three divisions, a method which leaves much to be desired, as is easily seen by the unnatural juxtaposition of remote genera which it brings about. You will see that there are but thirty genera, and the last, *Forficula* is not coleopterous at all, but nearly all the other genera have become the foundation of modern families.

But the great and merited fame of Linnæus rests not so much on the scientific accuracy of his classification, as on the fact that he really originated all scientific nomenclature. Before his time genera were indefinite and shadowy, and specific names were often of two or three words, but Linnæus not only divided all the then known forms of nature into settled and distinct genera, but fixed an unalterable word to indicate each species; this word as we know, and which he called the trivial name, we the specific, must always be either adjectival, qualifying the generic name and agreeing with it in gender, or else a proper name, as is common among the Lepidoptera, "Ma-chæon," "Aglaia," for instance. This specific and generic name came to be equivalent to the christian and surname of men, and as many individuals bear the same christian name without losing their identity, so such names as *mollis*, *rufa*, *ater*, &c. are repeated over and over again without creating confusion among species. The herculean work of Linnæus was, like a second Adam, to find a name for each separate organism, and although his classification has been to a great extent, especially in botany, disproved, the system of nomenclature which he originated is now the framework of all our more accurate knowledge, and as it were the rudiments of the universal language of science.

In reviewing the value of the work of Linnæus, what we must specially bear in mind and insist upon, is this difference between a true *natural order* which he undoubtedly failed to apprehend, and that *orderly system* of arranging facts, without which all knowledge would be useless if not impossible, we must remember, too, while recognizing the fallacies into which he fell, not only that the task he set himself to perform was almost superhuman, but that he too was the child of his age, and *that* was the especial age of artificiality: nature was everywhere subordinated to art, the poetry, the painting, the architecture, even the gardens of that time manifest its indifference to what we now regard as the higher inspirations of genius, its bondage to method and approved conventionality; and in an age when the English Pope was considered the most illustrious of poets, the Swedish Linné might well be held the first of naturalists.

But Linnæus although he erred greatly from a truly natural order, cleared a path by his labours in which others followed in ever increasing numbers, and after him the first author who merits our attention is a doctor of Paris, one Etienne Louis Geoffroy. It was three years before the final issue of the *Systema Naturæ*, (that was in 1764), that Geoffroy published his "*Histoire des Insectes*." In this work he proposes a classification on rather new lines, but no improvement at all on his predecessors, for he unites with Coleoptera both what we call now *Dermaptera* or *Euplexoptera* that is the Earwigs, and also the greater part of the Hemiptera; but in subdividing his orders he discards the Linnean divisions according to antennæ and substitutes what is known as the tarsal system. He groups all the insects be included in Coleoptera into three main divisions:—

1. Hard entire Elytra: includes nearly all the Coleoptera except Brachelytra and perhaps Malacoderma.
2. Hard shortened Elytra: Brachelytra and Forficula.
3. Soft Elytra: Hemiptera and perhaps some Malacoderma, Meloe, &c.

Each of these groups Geoffroy divided into four or fewer, lower grades, according to number of tarsal joints, thus we get *Pentamera*, *Heteriomera*, and *Trimer*a. Of course, he overlooked the fact since discovered by M'Leay that the *Tetramera* and *Trimer*a are only apparently so. This tarsal system although really not more natural than an antennal one has been found very convenient, it characterized all the early schools of French entomologists, was adopted and extended by the great Latreille and since his day has been used more or less by all authorities down to quite recent times.

About the same time (1766), a Thurengian, Jacob Schaffer, gave to the world his work "*Icones insectorum circa Ratisbonam indigenorum coloribus naturam referentibus expressæ*," a fairly long title even for an entomological work in those days. Schaffer's system was decidedly original, he only allows three orders: 4-winged, 2-winged, and no-winged. Coleoptera are grouped into two sections: long elytra and short elytra, which is at any rate simple to remember. You perceive he used the elytra as Geffrey did to divide the order, and also adhered to that author's tarsal system in his sub-divisions. We may remember Schaffer from the genus *Telephorus*, which he first proposed; but his work impressed no lasting mark on the general development of science, and both he and his insects of Ratisbon have long since been swept into the limbo of forgetfulness.

Another name which demands our attention is that of Carl de Geer, a fellow countryman of Linnæus. De Geer was a member of the upper classes, and devoted a considerable fortune to the pursuits of Entomology. He published during his lifetime about twenty volumes on his favourite study, the principal of which was his "*Memoires pour servir a l'histoire des insectis*," which was finally concluded in 1778, the year of his death and you will observe twelve years after the final issue of the "*Systema Naturæ*," De Geer's chief claim to remembrance lies in the fact that he finally cleared up the confusion which had been brought about by Geffrey, between Coleoptera and some of the other orders, and selected the true position of *Forficula* as not Coleopterous; but he did not do much to advance the general classification of the order, and appears to have followed the antennal system of Linnæus, rather than the tarsal one of his French contemporary.

This brings us to the closing years of the eighteenth century, and we find the intellectual life of Europe assuming a wider horizon, and natural science finding many exponents in many lands.

Clairville, a Swiss, struck out a path for himself. His "*Entomologie Helvetique*" was published in Zurich, in 1798. He was the first to give that prominence to the mouth organs, which has been so generally relied on since, as affording a basis for a really natural system, and divided all insects into Mandibulata, or such as are possessed of biting mouth organs; and Haustellata, or those which have sucking or tubular mouths. This classification has, as you know, been adopted by the earlier English systematists, such as Stephens and Westwood. Clairville, nothing if not original, discarded all the Linnean names of orders including the venerable Aristotlean Cole-

optera, for new terms of his own invention. The Coleoptera thus became Elytroptera, which has exactly the same English equivalent. These new names of Clairville, however, never came into general use, in fact scarcely survived their author. But to this Swiss we owe a number of genera we now recognize. It was he who split up the great genera *Carabus* and *Curculio* of Linnæus, which latter apparently embraced almost all the Rhyncophora into several distinct smaller ones. Thus of *Carabus* he made *Carabus*, *Labrus*, *Badister*, *Sphodrus*, *Stomis*, and *Trechus*; while *Dytiscus* became *Hydroporus*, *Colymbetes*, *Dytiscus*, and *Noterus*. These changes, however, were not made before 1806, and we are slightly anticipating the current of development.

Reverting therefore a few years back, we find it was a Dane, one John Christian Fabricius, on whom the special mantle of the great Swede fell as regards Entomology. In any review of the study of Coleoptera, the name of Fabricius takes a prominent position. He was born in Tendern, Schleswig, in 1748, occupied a professor's chair in Kiel University, and died in 1807. He seems to have been a pupil of the great savant of Upsala, and followed closely in the master's footsteps. He, however, like Clairville, could not resist the temptation of calling Coleoptera something else, so with Fabricius, we must learn to call beetles "Elutherata." His "System Eleutheratorum" was published at Kiel in 1801. This work may be regarded as containing his final classification; in it he recurs to the antennal system of Linnæus, but expands the groups into six instead of three. Thus:

1. Antennæ with club Lamellate (Lamellicornis).
2. Do. „ „ Perfoliate (including all Palpicornia and part of Clavicornia).
3. Club solid or inflated (remainder of Clavicornia and part of Rhyncophora).
4. Antennæ muniliform (beaded) (part of Rhyncophora, Brachelytra, Heteromera, Phytophaga).
5. Antennæ filiform (thread-like).
6. Antennæ setaceus (bristle-like).

This arrangement results in the division of such allied genera as *Carabus* and *Cicindela*, and the union of such dissimilar ones as *Dytiscus* and *Forficula*, again made a beetle of in this plan. Thus it seems a too great devotion to what may be called the Northern or Linnean school, led Fabricius rather far from a truly natural system. But we owe to him the discovery of a great number of new species, to which he applied specific names with a singularly happy appropri-

ateness, so that we can now almost tell from the applicability of its name whether or not any particular species was discovered by this author. Fabricus also originated that further sub-division of genera which afterwards, in the hands of Olivier and Latreille, led to the idea of families, thus Fabricus divides what he calls *Carabus*, but which was nearly equivalent to what we call *Geodephaga*, into five sections, according to the shape of the thorax, that being, of course, previous to Clairville's divisions in 1806. The total number of genera was brought up to about 120 by this author, Linnæus only having determined 30.

We must now cursorily refer to a number of authorities, who, between 1790 and 1810, were continually adding new species to those already described, and proposing new genera by splitting up old and creating fresh ones. One of the principal of these authors was Illiger, a German. In 1798, the same year which saw the issue of Clairville's work, he published his "*Käfer Preusseus*," and from 1802 edited an entomological magazine in Berlin, probably the first serial of its kind. He adhered, as regards classification, to the French or tarsal system, and we may remember him by the well-known genus *Aphodius* which he first named. Besides Illiger, Panzer, Voet, Sterm, Paykull, Frølich, Herbst, Creutzer, Olivier, and various other authors, mostly German, and whose initials appended to the names in our specific lists, are familiar to many of us, were during these years publishing works, contributing monographs to "*Illiger's Magazine*," or writing papers for the various scientific societies of the continent. Olivier, a French doctor, is one of the most noteworthy of these. He published in 1789, an "*Entomologie*" in eight volumes, and seems to have corresponded with Dr. Marsham in England, and all the best entomologists of the continent. He determined several new species, but he was as regards classification an attached tarsalist. All these authors indeed were divided into either the Northern school of Linnæus and Fabricius, or the French one, which about that time was beginning to be elaborated by the Abbè Latreille. We must remember that at that time there were no family or sub-family groups, only artificial divisions, differentiated by tarsi or antennæ, and genera which bore more natural affinities. It is extremely difficult for us now to trace the exact course of generic development during these years, as the same names were used by different systematists for different genera, or different names for the same insects; fresh editions of the various text books were constantly being issued, each one containing some corrections or improvements on former editions; generic characteristics were continually being modified by the discovery of

new types; and for these twenty or thirty years between Geffroy and Latreille, although progress was being annually made, it is difficult, if not impossible, to assign to each author his own peculiar share in it.

(To be continued).

The Blown-over V. The Climatic Influence Theories.

By H. H. CORBETT, Esq., M.R.C.S.

The phenomenon of the sudden appearance of one or more species of insects, generally more or less rare, in unwonted numbers, has long been a subject of interest to entomologists, and has during the late summer of 1888 been especially brought before our notice in the case of *D. galii*. Several theories have from time to time been advanced to account for such sudden influxes. The chief of these are known as—First, the blown-over theory: by which it is supposed that insects are either voluntarily, by some migratory instinct, or involuntarily, by stress of weather, carried over from their head-quarters on the continent to our islands. Second, the climatic influence theory: by which it is supposed that through some peculiarity of climate, a species may be so well suited that it increases in numbers far beyond what is usual with it; or that having laid dormant for years in either the oval or pupal states, it is suddenly awakened, and appears in great numbers as either larvæ or imagines.

Many entomologists appear to adopt one of these two theories, to the exclusion of the other. It seems to be a strong trait of human character to take sides on any question, and to refuse to see any good or truth in the opinion of those whose views are different. But I think that in this, as in many other cases, the truth is to be found in both sides; and it will be my endeavour to show good reasons for supporting both views. I do not wish to appear dogmatic, or to attempt to set up my own opinion against those of other naturalists, but to throw out a few ideas and suggestions, subject to correction, of what seem to me to be the probabilities of the case.

Certain species are known to be very irregular in appearance, even among our commoner insects, e.g. *C. edusa*, *P. cardui*, *C. promissa*, *C. sponsa*, *P. gamma*, and many others. While among the rare

Sphinges this is particularly the case, as witness the *Convolvuli* years 1846 and 1887, and the *Galii* years 1870 and 1888; it is true also that many species of insects travel great distances across the land and sea, and that great migratory swarms of butterflies and moths have from time to time been noticed.

It is equally true that other species appear in certain seasons in excessive abundance under circumstances which preclude the probability of any accession of numbers from abroad. Such small and weak species as *Tortrix viridana* and *Hyponementa padellus* can not be supposed to cross the ocean in order to appear in the tremendous numbers that they do in certain seasons; I think that no one would suppose that these were "blown-over." Again, in the case of *Promissa*, *Sponsa*, and *Quadra*, I think that it is highly improbable that these in their abundant seasons are increased from abroad. They are always present with us; one never hears of a summer in which not a single specimen is taken. Furthermore, when they do appear plentifully, it is always in those localities where a few may be taken in their scarce seasons, chiefly in the New Forest. One never hears of *Promissa* appearing in abundance in all parts of England or even in Ireland and Scotland; also in the case of these species (*Promissa*, *Sponsa*, and *Quadra*), I believe it to be generally the case that the larva is abundant before the imago, in fact, that they are natives bred and born.

In the case of *P. cardui* is, I think, different. No one will deny that it is a true indigenous British insect; but from time to time it would appear that the number in Britain is greatly increased from the Continent. The perfect insect appears in abundance without the larva having previously been observed to be particularly plentiful. A few years ago, I forget the year, a migratory swarm of *Cardui* and *Gamma* was traced in its course from the southern part of Europe northward, and part of the great swarm came to Britain. The same is probably the case with *Edusa*. Both these insects are always with us, but occasionally it would seem that their numbers are increased by migration.

When the case of such an insect as *Galii* is considered, I think that most probably we shall find that it is—so far as Britain is concerned—a purely imported species, and that in all probability our climate is not suited for its permanent residence with us. We do not hear of the larvæ of *Galii* being found in England in 1887, but in the summer of 1888 the perfect insects suddenly appear all round the coast. Where do they come from? Is it probable that they have been buried as pupæ since 1870? and if so, is it probable that such a cold season

as 1888 would be the only one out of the eighteen that have elapsed, to bring them out? I think that both these questions must be answered in the negative. *Galii* is an insect easily forced in the pupa, as witness five specimens in my possession which were collected as larvæ last September and hatched as imago in November and December. An insect so easily affected by temperature as this, would surely have been developed on the sunny sandhills of the Cheshire coast (where my specimens were taken), in less than eighteen years. And if none of the other seventeen years would produce it, would the cold season of 1888 be likely to do so? I have not heard of any of the larvæ collected in 1870 remaining long in the pupa. Perhaps some collectors who took specimens in that year will enlighten me if such were the case. So far as I have learned, all or nearly all hatched before the summer of 1871 was passed.

But there is another theory advanced by those who altogether oppose the idea of migration; it is that *Galii* is always with us, but only plentiful in certain seasons. That from 1870 to 1888 there were a few developed every year and that these were enough to keep up the breed until a season came round which suited them, but at the same time were so few that they escaped the diligent search of numerous eager collectors. I hardly think that this idea will bear close investigation. For let us suppose that at Wallasy, Cheshire (one of the most abundant places for *Galii* both in 1870 and 1888), there have been a few specimens bred every year, so few that none have been found, although the said hills in this locality are visited by entomologists almost daily. And then in 1888 the larvæ is taken in hundreds if not in thousands. Now, let us consider some other localities where *Galii* has been taken during last autumn. A few were taken in Ireland, a few at Warrington, a few at Cambridge, and in many other places a few were taken. If now there were at Wallasy, in the years '70 and '88, so few specimens that none were found, and these increased to many hundreds; how many would there be during the same time at Warrington or Cambridge in order to produce, under similar circumstances, only a few specimens? If this problem could be worked out as a proportion sum, the answer would be that at those places where a few larvæ were found in '88 then were found in the years '70 and '88 a fractional part of one specimen. And as Euclid says "this is absurd."

It will be very interesting to see how many wild specimens of *Galii* are taken this year in the localities where the larvæ were so abundant last autumn. Although the search was diligently prosecuted many

must have escaped, and these should appear next season as imagos. But I fear that our climate is not suited to this lovely species, and that *Galii* cannot be looked upon as a permanent resident with us, but only as a witness to the probability of "the blown-over theory."

Doncaster, January, 1889.

A Contribution to the Life-history of *Lophyrus Pini*.

BY THE REV. HILDERIC FRIEND, F.L.S.

On the 11th of July, 1888, I received a tin box from a gentleman living near Wigton, in Cumberland, which contained a number of insects and other natural history subjects. The principal contents of the box, however, consisted of a young branch of Scotch fir (*Pinus sylvestris*, L.), nearly stripped of its leaves by a number of caterpillars. Being at the time away from home, I was unable to give the objects anything more than a casual examination; and as I was preparing to visit Scotland shortly after, I saw no chance of studying the larvæ for some considerable time. I put them aside with their supply of food, till some more convenient season should arrive. Unfortunately, I omitted to put a specimen of the caterpillar in spirit for detailed examination, so am unable to say anything about its false legs, but one could not fail to be struck by the wonderful similarity between the colour of the creature and its host plant. This would probably be a result of two factors (1) protective coloration, and (2) green food.

Some weeks passed, and when I next opened the box all the caterpillars, save two which were not sufficiently well fed, had spun cocoons—the whole of the food supply being exhausted—and were in a state of quiescence. I thereupon took them from the box, and placed them in another made of cardboard, with a glass top, the box being then deposited on a table opposite the window, in a small room with a northern aspect. This was in August, and when September was still young, I was one day in the room referred to, making some observations, when I noticed a crack in the apex of one of the cocoons. Looking over the box I soon found that two of the insects had emerged, and were quietly taking a survey of their prison-house. They were at once placed in spirit, and the box carefully watched from day to day till all had emerged, when it was found that there were two males to eighteen females, or ten per cent—which, I believe, is a large pro-

portion for this class of insects. While they waited in spirit for more careful examination, I weighed over in my mind the curious problem which the insects had presented. Here were caterpillars spinning a cocoon after the fashion of silkworms (Lepidoptera), yet the insects which emerged from the case were evidently Hymenopterous. Every student knows that striking anomalies of this kind often enable him more readily to find a clue to the mystery he wishes to solve than do a long series of regular and normal transformations. So here, the facts noted pointed indubitably to the Tenthredinidæ, concerning which family Figuiet says (*The Insect World*, p. 399), "The larvæ of these insects have a striking resemblance to the caterpillars of Lepidoptera. They can only be distinguished from them by a great globular head, not hollowed out, and by their abdominal legs, in general to the number of more than ten. They are called false caterpillars. They spin a silken cocoon before changing into pupæ."

Here, then, we are able to take our start: our insect is Hymenopterous, and belongs to the saw-fly family or Tenthredinidæ, which with the tailed wasps (Sericidæ) from the tribe Phytophaga. In looking up the modern literature of the subject I was doomed to disappointment. Though I soon found that the insect, known to Entomologists as *Lophyrus pini*, was mentioned in all the text books, I also found that few of them gave any details of its life-history, and what was more tantalizing, whenever a figure appeared it was also the same old illustration of a male, magnified two diameters, with no hint as to the fact that it was enlarged, or if so, no particulars about the extent of magnification. The reader will find *Lophyrus pini*, male, magnified to twice its original size, and always the same impression, in Figuiet, p. 399; in Mr. Bath's *Ants, Bees, &c.* (Young Collector's Series), p. 32, misprinted *Lophyrus*; in Cassell's *Natural History*, Vol. VI., p. 8, and elsewhere. Mr. Bath says not one word about the insect, Figuiet simply informs us that "the *Lophyrus pini*, which devours the leaves of pine trees, belongs to this family," while Cassell's book gives us five lines in all. Perhaps it is because every entomologist knows so much about the insect that he passes it by in silence, but if this be the case, those who (like myself) can only know it by personal study—not having costly text books to refer to—will pardon these first-hand observations. Withering was not ignorant of the ravages of the caterpillars, for, though no mention is made of them in the 5th Ed. (1812) of *British Plants*, yet in the 7th Ed. (1830) we read (p. 819) that the "Pine forests of Scotland are the most productive places for the uncommon (*sic*) *Lophyrus pini* (Curtis, *Brittsh Entomologist*,

Vol. II., p. 54); whose larvæ are gregarious, assembling in numerous troops on the branches, and not only devouring the leaves of the pine, but also the bark of the young shoots." It would seem then that 50 years ago *Lophyrus* was either rare, or had not been carefully observed. Since that time it has either become more plentiful, or else its habits have been more fully studied, for in 1883 it is spoken of as a "very common species on coniferous trees." The only description I have seen of the insect is as follows: "The sexes differ in colour, the male being black with yellow legs, and the female yellow, with the head, three spots on the thorax, and the middle of the abdomen black; the antennæ in the female are serrated, in the male pectinated on both sides. The insect is about a third of an inch long (Cassell's *Natural History*, Vol. VI., p. 8.)"

This, then, is the amount of information I possessed when—on January 1st—I commenced the careful study of the insect under consideration, and with this introduction, I shall proceed in my next paper to lay before the reader the results of my personal examination.

(To be continued).

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

The Fifty-sixth Anniversary Meeting, January 16th, 1889.—Dr. D. SHARP, F.L.S., President, in the chair.

An Abstract of the Treasurer's Accounts, showing a balance in the Society's favour, was read by Mr. Osbert Salvin, F.R.S., one of the Auditors; and Mr. H. Goss read the Report of the Council. It was announced that the following gentlemen had been elected as Officers and Council, for 1889:—*President*, the Right Hon. Lord Walsingham, M.A., F.R.S.; *Treasurer*, Mr. Edward Saunders, F.L.S.; *Secretaries*, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; *Librarian*, Mr. Ferdinand Grut, F.L.S.; and as other Members of Council, Mr. Henry W. Bates, F.R.S.; Captain H. J. Elwes, F.L.S.; Mr. Wm. H. B. Fletcher, M.A.; Mr. F. DuCane Godman, M.A., F.R.S.; Prof. Raphael Meldola, F.R.S.; Dr. Philip Brooke Mason, F.L.S.; Mr. Osbert Salvin, M.A., F.R.S.; and Dr. D. Sharp, F.L.S.

Dr. Sharp, the outgoing President, then delivered an Address, for which a vote of thanks to him was moved by Captain Elwes, seconded by Mr. Osbert Salvin, and carried. A vote of thanks to the Treasurer, Secretaries, and Librarian, was moved by Mr. J. W. Dunning, seconded by Lord Walsingham, and carried. Mr. Saunders, Mr. Goss, and Mr. Grut, severally replied.—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

December 20th, 1888.—Mr. Hockett, Vice-President, in the chair. Exhibitions: Mr. Hanes, a series of *A. aprilina*. Mr. Clark, a series of *A. cinerea*, four bred and two captured; the bred specimens differing from those taken at large in having clear grey wings and the crossing lines being very dark and distinct; the captured specimens were dull ochreous brown, with the lines faint and undecided, these specimens were also the larger of the two forms. Referring to this exhibit Mr. Clark remarked that these insects were from the locality of Lewes, and that all the captured specimens he had seen were totally unlike those exhibited; other members also remarked upon this apparently unusual form of the species.

January 3rd, 1889.—Mr. Hockett, Vice-President, in the chair. Exhibitions: Mr. Hockett, a series of *P. unguicula*, bred in December, without forcing. Mr. Clark, lepidoptera from Forbes, consisting of a series of *C. suffumata*, with variety *piceata*, and specimens of *M. rubiginata*, one of the latter being very large and of dull colour. Mr. Hanes, a series of *X. rhizolitha*. Mr. Lewcock, specimens of *Dascillas cervinus* and *Melandrya caraboides*; also two specimens of *Centrotus cornutus*, a species Homoptera taken by him at Esher, in June last. In this curious-looking insect the pronotum is developed in the most extraordinary manner into two horn-like projections or ears—hence its name, the Eared Hopper; it was this remarkable development which attracted Mr. Lewcock's attention to it at the time of capture. Mr. Hanes mentioned having found a very large and nearly ripe wild strawberry on Dec. 23rd; and several members contributed remarks concerning the abnormal mildness of the early part of December last. The President read a letter announcing the death of Mr. Eedle, a well-known naturalist, who was one of the founders of the Society.—EDMUND HANES and G. A. LEWCOCK, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

December 27th, 1888.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Messrs. F. E. Fenton, M.R.C.P., F. P. Perks, J. Scudder, and W. Reid were elected members. Mr. F. E. Strong exhibited full-fed larvæ of *Bombyx quercus*, from Abergele, N. Wales, and made some remarks thereon. Mr. R. Adkin, a long series of *Pygera anachoreta*, and remarked that in a recent number of the "Young Naturalist," Mr. Gregson, in an article on this species suggested that the continental specimens were readily distinguishable from British by their ashy grey shade, the series now exhibited were all bred from one stock and the colour varied from a brown tinge to the most ashy grey tints, and he therefore thought that too much reliance should not be placed on the shade of colour. Mr. Billups read a paper "A partial list of Parasitic Ichneumonidæ with the hosts from which bred and reared during the last three years by a few members of the Society." The list consisted of some 100 species, numbering some thousands of specimens, many of the species being new. Mr. Billups said that if this number could be got together by nine or ten lepidopterists, which was only a tithe of what must have been bred by

the members, and he expressed a wish that all members would assist him by adding to the list all parasites that they might breed during the coming season.

January 10th, 1889.—President in the chair. Mr. R. Adkin exhibited *Noctua glareosa*, from Kent, Barnsley, York, Perth, Forres, and Shetland. The Shetland specimens, and one of those from Perth approaching a melanic form, the others being of the pale grey or slightly of the rosy type. Mr. J. A. Clarke, dark varieties of *Cidaria suffumata*, black and suffused form of *Melanthia bicolorata*, and a fine variety of *Oporabia dilutata*. Mr. Tugwell, a series of *Boletobia fuliginaria*, with an empty pupa case and sketches of the larvæ at rest and feeding, and contributed notes, in which he stated that in his opinion, the insect was a true Geometer rather than a Noctua. Mr. White, coloured drawing of a variety of *Catocala nupta*, having the inferior wings blue, taken by Dr. Laver, at Colchester. Mr. E. Joy, bred specimens of *Pygæra reclusa* (*pigra* Hufn.), from Wicken Fen. Mr. Chittenden, very black forms of *Audalia inornata*, taken at Ashford, Kent. Mr. Jenner Weir, exhibited with other species a female specimen of *Anosia plexippus*, which he had received from Mr. Cockerell, Custer Co., Colorado, and stated that although in this specimen the inner edge of the wing was quite as black as those received by him from Canada and Hudson's Bay; it yet differed in the colour of the spots in the fore-wings being all white, whereas, in the northern specimens the four large central spots were of a fulvous brown, little inferior in richness to that of the disc of the wing. At the same time he shewed a water-colour which had been made from the specimen taken at Lindfield, 1876, from which it appeared that the example then captured resembled the more northern form of the species. Male and female specimens of *Pieris oleracea* were also exhibited by Mr. Weir, who said he had also contended this species was not identical with *P. napi*; and he received a communication from Mr. Scudder, who wrote that he had now been able to make the comparison wished, and could report the two species were distinguishable from each other in the caterpillar and chrysalis stages, as surely and readily as *P. napi* and *P. rapæ* could be distinguished in the same stages. Mr. T. R. Billups, exhibited types of eighty species of parasitic Hymenoptera with cocoons, from which many had emerged, and in some cases the larvæ from which they were reared.—H. W. BARKER, Hon. Secretary.

A Contribution towards the Beetle-Fauna of Llangollen.

BY DR. JOHN W. ELLIS, F.E.S.

During a three days' holiday spent with Mr. Wilding last Whitsuntide (May 19th to 21st) in this delightful part of North Wales, I met with so many species of coleopterous insects not hitherto recorded from that district, that I have appended my list of captures on that occasion, as recorded in my diary, in the hope that it may be of service

to entomologists spending a holiday in the vale of "sweet Jenny Jones." I should premise that the weather was fine and warm, and had been so for a few days previous to our visit.

Arriving at Llangollen about four p.m. on the afternoon of the 19th, we spent the remainder of the day in sweeping the herbage on the bank of the canal and that growing by the roadside. The result—so far as my own net was concerned—was :

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| <i>Homalota depressa</i> , | <i>Phyllotreta nemorum</i> , |
| <i>Aleochara tristis</i> . | „ <i>sinuata</i> , |
| <i>Tachinus pallipes</i> , | „ <i>tetrastigma</i> , |
| <i>Homalium rivulare</i> , | <i>Phædon tumidulum</i> , |
| <i>Lathrimæum atrocephalum</i> , | <i>Crepidodera rufipes</i> , |
| <i>Coccinella 22-punctata</i> , | <i>Ceuthorhynchus quadridens</i> , |
| <i>Meligethes rufipes</i> , | <i>Apion livescerum</i> , |
| <i>Onthophilus striatus</i> , | „ <i>fagi</i> , |
| <i>Brachypterus pubescens</i> , | „ <i>onopordi</i> , |
| <i>Anisotoma calcarata</i> , | <i>Anthonomus rubi</i> , |
| <i>Cyphon variabilis</i> , | <i>Eirirrhinus acidulus</i> , |
| <i>Prasocuris marginella</i> , | <i>Sitones sulcifrons</i> , |
| <i>Plectroscelis aridella</i> , | <i>Ceuthorhynchidius troglodgtes</i> , |
| <i>Psylliodes affinis</i> , | <i>Tychius pygmæus</i> , |
| <i>Thyamis fuscicollis</i> , | <i>Sciaphilus muricatus</i> , |
| „ <i>lurida</i> , | <i>Otiorhynchus ligustici</i> . |

May 20th.—We spent a couple of hours or so in collecting among the shingle on the river bank, which was absolutely teeming with *Bembidiæ*. Result :

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| <i>Bembidium decorum</i> , | <i>Homalota currax</i> , |
| „ <i>punctulatum</i> , | „ <i>hygrotopora</i> , |
| „ <i>tibiale</i> , | <i>Bledius fuscipes</i> , |
| „ <i>atrocæruleum</i> , | <i>Trogophlæus arcuatus</i> , |
| <i>Perileptus areolatus</i> , | <i>Cryptohypnus dermestoides</i> . |

Leaving the river we struck off for the moorlands, more especially in the neighbourhood of Moel-y-Gamelin. Among our captures were the following :

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| <i>Calathus micropterus</i> , | <i>Hister carbonarius</i> , |
| <i>Miscodera arctica</i> (8), | <i>Byrrhus fasciatus</i> , |
| <i>Harpalus ignavus</i> , | <i>Onthophagus ovatus</i> , |
| „ <i>latus</i> , | <i>Aphodius sticticus</i> , |
| „ <i>proteus</i> , | „ <i>pusillus</i> , |
| <i>Amara ovata</i> , | <i>Geotrupes vernalis</i> , |
| „ <i>communis</i> , | <i>Agriotes sputator</i> , |
| <i>Badister bipustulatus</i> , | <i>Corymbites æneus</i> , |
| <i>Lathrobium multipunctum</i> , | „ <i>holosericeus</i> , |
| <i>Actobius procerulus</i> , | <i>Cionus scrophulariæ</i> . |

May 21st.—From an early hour in the morning, until about five o'clock, was spent in beating trees, dead sticks in hedges, &c., in and about the woods on the slope behind Valle Crucis Abbey. Among my own captures were :

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| <i>Dromius meridionalis</i> , | <i>Rhinosimus planirostris</i> , |
| <i>Homalium florale</i> , | <i>Anaspis frontalis</i> , |
| <i>Anthobium ophthalmicum</i> , | „ <i>fasciatus</i> , |
| <i>Epuræa æstiva</i> , | <i>Clytus mysticus</i> , |
| <i>Attagenus pello</i> , | <i>Pogonocherus pilosus</i> , |
| <i>Athous hæmorrhoidalis</i> , | <i>Phyllobius pyri</i> , |
| „ <i>vittatus</i> , | „ <i>alneti</i> , |
| <i>Dolopius marginatus</i> , | „ <i>maculicornis</i> , |
| <i>Telephorus obscurus</i> , | „ <i>oblongus</i> , |
| „ <i>nigricans</i> , | <i>Polydrosus cervinus</i> , |
| <i>Priobium castaneum</i> , | <i>Trachodes hispidus</i> , |
| <i>Cis fuscatus</i> , | <i>Hylesinus vittatus</i> . |
| <i>Orchesia minor</i> , | |

Among the Hemiptera-Heterophera there were “bottled” during the three days, the following only have been verified :

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| <i>Plinthisus brevipennis</i> , | <i>Livcoris tripustulatus</i> , |
| <i>Sciocoris terreus</i> , | <i>Scolopostethus affinis</i> , |
| <i>Nabis rugosus</i> , | <i>Velia currens</i> , |
| <i>Miris lævigatus</i> , | <i>Genis najas</i> . |

Of the above species, those which are most worthy of note are *Perileptus arcolatus* (recorded previously from only a single locality in Wales, Bettws-y-Coed) and the scarce weevil *Otiorhynchus ligustici*, which is scarce in collections. My specimen was found crawling on a wall close to Llangollen.

Collecting in the Trossachs.

By A. ADIE DALGLISH.

How light the entomologist's heart feels when the time draws nigh that he can flee away to spend a week or so in some secluded corner, far from the din and rattle of a great city. Some put the sea between them and the scene of their toils, others climb mountains, previously supposed to be inaccessible, except to the wild goat or the chamois. “Away, away, and as far away as possible!” is the general cry. What pleasanter change can one desire, from the cold grey walls and hard pavements, than the beautiful and picturesque scenery of the Trossachs?

On Saturday (11th August), I left Buchanan Street Station, Glasgow, by the mid-day train, in company with my brother. We arrived in Callender about two o'clock, after many stoppages and much wasted time, not an uncommon occurrence on all Highland railways. The coach between Callender and the Brig-o-Turk takes about two hours, and as it rained nearly all the way, not much was seen of the surroundings. When we arrived at our destination, the good wife of the house quickly prepared a substantial tea, which was refreshing after our long and wearisome journey. About six o'clock the rain had gone entirely off, so we got our nets into working order, and had a short turn down the road by the bridge. Very few insects were seen, only one or two specimens of *Cidaria fulvata* and *Ypsipetes elutata* being captured.

Sunday unexpectedly turned out a fine day. We had a long walk over the hills to Loch Drunkie; many fine specimens of *Argynnis aglaia* were flitting about, *Vanessa urtica* was not uncommon, *Chortobius pamphilus* and *Lycæna alexis* were everywhere, *Pieris brassica* and *P. rapæ* were very common, but very few specimens of *P. napi* were on the wing. An occasional specimen of *Anarta myrtilli* would rise, circle about for a minute or two, and then disappear among the heather, *Larentia didymata* was there in hundreds, and a countless number of micros. After having a rest on a heathery knoll, which commanded an extensive view of the surrounding country, we returned, going down Trout Burn, across the meadow, and were once again at home.

On Monday I went back to Loch Drunkie, it was a beautiful day, the sun was shining brightly overhead, and a strong but pleasant breeze was blowing from the south-east. I captured a specimen of *Emmelesia ericetata*, and one specimen of *Cosmia trapezina* sitting on the heather. I also took two types of *Anarta myrtilli*, but as they were battered and torn, I let them go to enjoy the few more days they had yet to live; a nice specimen of *Celaena Haworthii* turned up and was quickly captured, *Agrotis porphyrea*, *Eupithecia nanata*, *Larentia cæsiata*, and *Cidaria russata*, were not uncommon but in very bad condition. In the evening we went up Glenfinlas to a large clump of fir trees known as the "Hero's Targe." This wild place is said in former times, to have afforded refuge to an outlaw, who was supplied with food by a woman; she lowered it down to a hole in the rock, from the brink of the precipice above: his water he procured for himself by letting down a dish tied to a string into the pool below. *Cidaria immanata* and *populata*, *Larentia olivata*, and *pectinitaria* were numerous, and a good number of commoner Geometers were still on the wing,

such as, *Metrocampha margaritata*, *Cabera pusaria*, *Rumia cratagata*, *Melanippe montanata*, and *Camptogramma bilineata*. When we returned home a nice specimen of *Cidaria prunaria*, was awaiting us on the window.

On Wednesday evening I went to the outlet of Loch Katrine, which is the very heart of the Trossacks, when going through a marshy piece of ground, I discovered a nice specimen of *Geometra papilionaria* sitting on a grass stem, *Crambus margaritellus* and *C. tristellus* were very common and in good condition; I also took a couple of *C. pinetellus*, a beautiful specimen of *Crocallis elinguarina* was sitting on the trunk of a birch, where it formed a very conspicuous object. *Larentia olivata* was also common sitting on moss on the rocks, it was very difficult to see, but an occasional waft with the net as I passed along would dislodge them. A few specimens of *Hepialus hectus* and *lupulinus* were hovering over the brackens. Did any one ever notice that the former of these two insects has a nice perfume when captured, pertaining somewhat of the smell of ferns?*

On Thursday evening we went up Glenfinlas to another large rock covered with fir trees; here *H. hectus* could be taken commonly sitting on the grass, *Melanthia rubiginata*, *Larentia olivata*, *Cidaria russata*, *C. immanata*, and *C. populata* were very common; we also took a few of the following micros, *Pædisca solandrinana*, *P. sordidana*, *Tortrix ribeana*, *Aphelia pratana*, and *Grapholitha nigromaculana*.

On Friday evening we visited the meadow below Duncraggan. *Tersata lignata* was very common, but I only managed to get my series as most of the specimens were useless. *Cidaria testata*, *Thera variata*, and *Ypsipetes elutata*, were common; we also took a few specimens of *Scoparia dubitalis*, *S. murana*, *Teras caudana*, and *contaminana*; a few specimens of *Hepialus humuli* were still on the wing, and single specimens of *Plusia chrysitis*, *Triphæna orbona*, *T. pronuba*, *Noctua baja*, and *Leucania impura* were taken.

On Saturday forenoon I climbed one of the hills which look down on Glenfinlas, the morning was fine and insects were numerous. *Pyrausta purpuralis* and *Herbula cespitalis* were flying about, a few specimens of *Polyommatus phlæas* just emerged from the pupa were on the wing: a nice specimen of *Argynnis aglaia* fell to the net, also one of *Eupithecia absynthiata*. In the evening we tried sugaring, but not with much success, a few specimens of *Xylophasia polyodon*, *X. rurea*, and *Cidaria populata* were all that visited it; we also took with the net a

* Yes, the observation was first made by Mr. C. G. Barrett. The smell emanates from the males only, and is doubtless the means by which the female is attracted, —J. E. ROBSON.

nice type of *Ellopia fasciaria*, one specimen of *Coremia munitata*; while *Acidalia aversata*, *C. prunata*, *pyraliata*, and *russata*, and *Melanthia ocellata*, were common.

The second week of our visit was very wet; we tried the meadow one evening, and took single specimens of *Epunda viminalis*, *Apamea oclea*, *X. cerago*, *X. silago*, and *Charæas grammis*; three or four specimens of *Crocallis elingvaria*, *Tersata lignata*, *Melanthia rubiginata*, *Noctua xanthographa*, and *Caradrina cubicularis*, were common, a single specimen of *Pterophorus trigonodactylus* was also captured.

We went up Glenfinlas on two or three occasions but caught very little, and added nothing new to our captures but a single specimen of *Melanippe subtristata*, though *Cidaria immanata*, *C. prunata*, and *Larentia olivata*, were still very common.

I had to leave the Trossachs on Monday morning, but my brother, who is an artist, waited on till the end of September, which is the best month for sketching, as the trees have donned their rich browns and yellows, and the heather is in full bloom.

About the beginning of September, *Epione apiciaria* appeared in the meadow in considerable quantity. *Xanthia cerago* and *silago* were common, and a few specimens of the pretty little pug *Eupithecia sobrinata*. In every corn-field *Polyommatus phlæas* and *Plusia gamma* were common, flying in the sunshine; micros were also numerous, *Peronea variegana*, *P. ferrugana*, *Pædisca solandrinana*, and *P. sordidana*, taking the lead, and a few specimens of *Aphelia pratana*, *Tortrix ribeana*, and *Sciaphila octomaculana*, were captured.

Towards the middle of the month frost set in, in the evenings. Noctuæ were now becoming more plentiful, *Hadena protea* and *Agriopes aprilina* could be taken on the tree trunks, a few specimens of *Cosmia trapezina*, *Noctua festiva*, *Miselia oxyacanthæ*, *Orthosia lota*, *Anchocelis rufina*, *A. litura*, *Hydræcia nictitans*, *H. micacea*, *Hadena oleracea*, and *Nonagria fulva*, were caught. *Ennomos tiliaria* was also common, but only one specimen fell to the net; *Oporabia dilutata* was very common on the oaks, and one type of *Orgyia antiqua* was captured.

Pollokshields, Glasgow.

Extracts from the Note Books of the Exchange Club.

CHÆROCAMPA CELERIO IN MONMOUTHSHIRE. Last Saturday I received from a carpenter, who had been working at Chepstow, in Mon-

mouthshire, last October, a specimen of *Chærocampa celerio*, small, but in fine condition. He took it at rest on a gas lamp in that town.—J. MASON, Clevedon, Dec. 7th, 1888.

CRAMBUS ERICELLUS.—This insect swarmed in Sutherland last summer, but, of course, the old story, I thought it was *pascuellus*. I could have taken any number of it, and only took one or two, finding out on my return that they were this rare species. I hope to visit the place again next July, and to find it in plenty.—J. MACKAY, Glasgow.

OXYPTILUS DISTANS.—The plume I sent out last time was so evidently attached to *Hieracium pilosella*, occurring only where that plant was growing in patches on one hill slope, that I rather hastily assumed it to be *O. pilosella*, but having doubts afterwards, I forwarded specimens for identification, and they were returned as undoubted *Distans* of the Brandon type. It is paler in colour, more feathery looking, and not so stiff an insect as *Teucriti*. *Hieracii* (true) has never, I believe, been taken in England. It may be distinguished by the white mark at the inner margin of the second digit of the fore-wing, being almost a "full moon," very different from *Teucriti*. *Teucriti* was Greening's plume, and according to the rules of priority of publication, the name of *Britanniodactylus* should be substituted.—SYDNEY WEBB, Dover.

Notes and Observations.

LYCÆNA ARGIADES AT BLACKPOOL.—About 25 years ago, Mr. Jos. Clegg, of Oldham, whilst collecting *Lycæna alexis* at Blackpool, to make pictures, caught a small specimen with tails, but which he thought to be only *L. alexis*. He set it, pinning it with a very short pin, the same as he used for *Alexis*. I afterwards obtained it from him, and it has been in my collection ever since under the name of *L. bætica*. Many of my friends have seen it, viz., the late Messrs. B. and N. Cooke, and Mr. S. J. Capper, and advised me to send an account of it to the entomological magazines. I neglected to record it, in the hope that some of my friends or myself would be so fortunate as to capture other specimens. Recently, Mr. J. Cosmo Melvill was looking through my collection, and requested me to let him see the underside of my *Bætica*, and immediately declared it to be *L. argiades*. —JOSEPH CHAPPELL, Manchester.

VARIETY OF *C. PORCELLUS*.—I have bred a grand variety of *C. porcellus*. It has the usual rose coloured body, and a fine rose coloured

narrow streak along the costal margin. The whole of the wing is a fairly bright olive green, with a faint show of grey shade on the inner margin. The inferior wings are greenish with faint grey brown shades along the inner margin.—W. H. TUGWELL, Greenwich, 28th January, 1889.

FORCING *D. GALII*.—I have been trying forcing some of my pupæ of *D. galii*, so far with fairly good results. I have 53 out all fine, only very slight depression in two bodies, and one very slightly crumpled wing, but not enough to spoil them as specimens. They came out at long intervals, the first on Dec. 9th, and by one, two, or three to date. I believe they are very delicate, both as larva and pupa, and that there will not be a vast number bred out of the grand take of larvæ in 1888. I hear that great mortality has attended many collectors. I turned out my last two boxes, when I hoped to find a large number of pupæ, but some 30 had died half changed, though fine, large, well-fed larvæ. Evidently the early cold of September paralysed them completely. I believe the reason we do not get it always in England is that the early cold and wet season settles them.—W. H. TUGWELL, Greenwich, Jan. 22nd, 1889.

PLUSIA NI.—I have an example of this insect, which I took myself off St. George's Church wall here, some eighteen years ago, but as there was not a blade of green food within a mile, I never thought it a British specimen, so it has remained among my odds and ends ever since. I will have to look it up now.—C. S. GREGSON.

E. CERVINATA.—*Eubolia cervinata* feeds on hollyhock, nay defoliates it. In fact hollyhocks cannot be grown where it abounds. At one locality I know in the Isle of Man, it seems to have given up feeding on the mallow, growing on the shingle, and along the wall sides on a footpath over a mile long, and to have gone "over the garden wall" to the hollyhocks.—C. S. GREGSON, Liverpool.

THE MILDNESS OF THE SEASON.—The season so far, appears to me to be a peculiar one. Although as mild or milder than the year 1884, the appearance of insects, &c. do not agree. In fact, I have not seen or heard of any insects having been seen yet. The snowdrops bloomed on the same day as in 1884, and exactly at the same place, but the hazel which flowered on January 13th, in 1884, has not yet been seen in this neighbourhood, though diligently looked for. In 1884, *Pilosaria* appeared on the 16th January, and *Leucophearia* and *Progemmaria* on the 20th.—J. W. CARTER, Bradford, 20th Jan., 1889.

On the Underwings of certain *Agrotidæ*.

By J. W. TUTT, F.E.S.

I can fully support Mr. Gregson's nomenclature of the specimen of *Agrotis*, mentioned by him in the *Young Naturalist*, Vol. IX., p. 238. Mr. Cross sent the insect to me, and I had no hesitation whatever in returning the specimen to him as *A. corticea*. But the variety did not strike me as presenting very unusual characteristics, as I have several very much like it, and others of the same form from Deal. But with regard to the former part of his note, Mr. Gregson has fallen into error, and his remarks on this group will be entirely misleading to those to whom the *Agrotis* offers more than sufficient difficulties already. Mr. Gregson states that: "*A. segetum* belongs to a group of the *Agrotidæ* having light and sometimes somewhat hyaline hind-wings in the males, a group that is without any discoidal lunule on the inferior wings, see *exclamationis*, *lunigera*, *saucia*, *suffusa*, *ripæ*, *segetum*, &c., among our British species."

I consider there are two or three essentially misleading points in the above quotation, short as it is, and for the sake of those who find a difficulty in working out the group satisfactorily, I would say a few words.

Mr. Gregson states that "*A. segetum* belongs to a section of the *Agrotidæ*, comprising *exclamationis*, *lunigera*, &c.," and from which he would exclude *corticea*. However closely allied *saucia*, *suffusa* and *segetum* may be, certain it is that *lunigera* forms a connecting link between these and another group containing *exclamationis*, *corticea* and *cinerea*, whilst *ripæ* forms a good connecting link between these and the *cursoria-tritici* group. To separate *corticea* and *exclamationis* into different groups would be suicidal to beginners, and lead them into endless difficulties. Better far to tell them they are closely allied, that *exclamationis* (males) have white hind-wings, females grey, while *corticea* has dark hind-wings in both sexes.

Again, Mr. Gregson states that these all belong to "a group that is without any discoidal lunule on the inferior wings." This is another most misleading statement, which I trust will lead none of our earnest young workers astray. Taking the species, which Mr. Gregson includes in this group (and including *corticea*), seriatim, we find the following facts:—

1. *Saucia*.—MALE: Hind-wings hyaline, whitish grey, with a dark hind-margin; dark nervures; lunule more or less distinct, rarely absent. FEMALE: Hind-wings hyaline, darker grey than in male; distinct lunule; dark nervures. (Worn specimens show the lunule least.)
2. *Suffusa*.—MALE: Hind-wings hyaline, whitish grey, with a narrower hind-marginal band than in *Saucia*; nervures dark; no lunule. FEMALE: Hind-wings almost as in males, but slightly darker; lunule indistinct.
3. *Segetum*.—MALE: Hind-wings white; no lunule; dark nervures. FEMALE: Hind-wings white, with dark outer margin; no lunule; dark nervures.
4. *Lunigera*.—MALE: Hind-wings pure white; nervures darker, but differing much in intensity; lunule varying from entire absence to being decidedly marked. FEMALE: Hind-wings white, with broad dark hind-marginal band; nervures blackish; lunule distinct.
5. *Exclamationis*.—MALE: Hind-wings white, with faint traces of a marginal band in some specimens; nervures variable in intensity from dark grey to very indistinct; lunule sometimes faint, generally absent. FEMALE: Hind-wings dark grey, base slightly paler; nervures darker; lunule generally defined, sometimes very distinct.
6. *Corticea*.—MALE: Hind-wings variable from whitish grey to dark grey; nervures slightly darker; lunule variable in intensity but generally distinct. FEMALE: Hind-wings dark grey; nervures dark; lunule generally distinct.
7. *Ripæ*.—MALE: Hind-wings white; nervures slightly darker; lunule indistinct. FEMALE: Hind-wings variable in colour, from white to dark grey; lunules generally distinct, but sometimes faint or absent.

I have a very large number of each of these species, and I find Mr. Gregson's statements utterly at variance with the facts as stated above. I trust none of our lepidopterists will try to classify their specimens by the colour of the hind-wings or by the lunule, as the specimens vary indefinitely in both directions, in each of the above species.

The variation of the commonest species is a most interesting study, and I trust that we shall soon have more notice taken of minor variations in different specimens of the same species.

Blackheath, January, 1889.

A Contribution to the Life-history of *Lophyrus Pini*.

BY THE REV. HILDERIC FRIEND, F.L.S.

(Concluded from page 35.)

Since my former paper (p. 33) was written, I have fortunately been able to obtain living material from the locality already named, which puts me in possession of the complete history of this insect. The eggs are glassy or hyaline, and rather large (about the one-twenty-fourth of an inch in diameter). They are deposited in a silken nest, at the base of the pine tree, so that when the larvæ emerge, their food supply may be ready to hand. This year the larvæ were already hatched in January, but whether this is normal, or due to want of frost, I cannot say. They are of a semi-transparent character, so that the green (or other colour) is due entirely to the food; and during their sojourn at the roots of the trees, they feed on the earth, rootlets, or other material lying around, and so appear a dirty brown. The jaws are brown and strong; two brown spots appear at the opposite extremity; and progression is apparently by means of stiff hairs (setæ), rather than legs—but these hairs, in all probability, take on the form as well as the function of false legs as the grub develops. The larvæ are about one-third of an inch in length, and present no other macro-scopical characters of importance. In due time the larvæ leave their abode, attack the nearest pine branches, feed, and then spin their cocoon. This is a very interesting production of a rich brown colour, a third of an inch long, of an oval shape, and very symmetrical form. The imago, so far as my observations go, emerges in the early autumn, but I have as yet failed to ascertain the food-plant of the perfect insect. Having enjoyed the bright days of September, and sought the society of the male, the mother fly deposits her eggs with due regard to the needs of her offspring, and gathers up her feet to die. Now the cycle is complete. The study of the perfect insect suggests two points of interest. First, the males must be polygamous, seeing there is only one male to ten females. Secondly, the antennæ of the males are so much more highly developed than those of the female, that we must suppose they are intended to aid it in discovering the whereabouts of its consorts.

A few words may now be permitted by way of description. We begin with the female, and remind the reader that these remarks relate to insects bred in captivity, and preserved as soon as they emerged. The insect is three-eighths of an inch in length, the larger pair of wings equalling the insect, and extending beyond the abdomen when folded. Thus when expanded the wings would measure about seven-eighths of an inch from tip to tip. Antennæ one-eighth of an inch, serrated on the inner side, composed of about twenty joints. Examined under the microscope these are seen to be covered with hairs. When newly hatched, the whole body, including the head, is of a yellowish brown, the back of the thorax alone being dark brown. There are three ocelli arranged in a line (not a triangle) midway between the compound eyes. The hind-wings, which are shorter and smaller than the fore pair, have about a dozen hooks in the middle of the inner edge, which attach themselves to a strong muscular bar on the inner edge of the fore-wings—thus keeping them firm when extended. The abdomen is without hairs, and the hindmost section shews minute projections, which constitute the usual ovipositing apparatus, which is similar to that found in other members of the family, and makes an interesting micro object. The strong brown jaws lead one to infer that the insects, like the larvæ, are capable of devouring solid food. The legs are interesting on account of the projections (? pulvini) on the lower extremity of each division. They are extremely muscular, and form a first-rate study for the microscopist.

The antennæ and the colour of the male at once distinguish it from the female. The illustration referred to on page 34 will give the student a general idea of the pectinated antennæ, the joints of which are about the same in number as in the female. The dark brown or black colour of the body makes the legs and underside of the abdomen appear richer than in the female, but the colour of these parts in both is the same, viz., light brown.

So far as I can judge the foregoing contains all the details which are necessary for a correct knowledge of *Lophyrus pini*, so far as general observation goes. Microscopical details would prove of little interest without illustrations, otherwise they could easily be furnished from my own dissections.

Carlisle, February, 1889.

A Bird Tragedy.

By G. GRAY.

Extracted from a paper on the Red-backed Shrike read at the Dover Field Club and Natural History Society, January, 1889.

One day towards the end of last June, I noticed a male shrike (*Lanius collurio*), which by its actions led me to think that the hen bird was nesting very near; but after searching the hedgerow on both sides in vain, I had to leave it as a failure for the time, which was disappointing, as I much wanted to secure a family group; and business might prevent me returning to the spot before the young birds had flown. However, fortune favoured me, and a few mornings after behold me sitting on a grassy bank, in full view of the place where I expected the nest to be. Having adjusted my field-glasses I scanned the hedgerow with greedy eyes. Not a bird was to be seen! Presently, however, I heard the singing of a tree-pipit, and soon discovered one perched upon a hedge-stake; scarcely had I perceived it when, with a sudden dash, a red-backed shrike or butcher bird passed, and as quick as lightning struck it from its perch into the grass beneath, whence I could hear it screaming and fluttering with its murderer. After a minute or two I saw the butcher bird, as if in cruel mockery mount with its prey, apparently now dead, upon the very stake he had just knocked the pipit from. After rubbing the body about on the top of the stake as if seeking to secure it by catching it upon a thorn and of course without success, he flew with it to a bush a little higher on the bank where there were some thick brambles interlacing with the branches. By its motions it evidently was trying to fix the body upon a thorn which was accomplished by continually drawing it along a stem until at length it became entangled; then, after looking at its victim as if to make sure it was safe, it flew away. About five minutes elapsed, and I was about to inspect his work, thinking that perhaps the pipit had been killed for a supply for the larder in prospective rather than for present need, when back he came; this time accompanied by the hen bird. She no doubt had been out upon the same errand, to get food for the young, but the male had been more successful. Both seemed to contemplate the pipit with satisfaction, great satisfaction I might say, by their actions—flying about it and almost dancing in their movements, in a manner I can only compare to a couple of savages preparing for an orgie. Then seemingly a con-

versation was held between them, for after a little chatter it would appear that an understanding was arrived at, which proved that the body of the pipit was not then in proper position. At that time it was hanging legs and body down and appeared to be caught by a thorn through one wing only. Active proceedings were commenced by the male bird holding down the wing while the female dragged up the body, pulling and tugging at it until it was firmly held by one or more thorns *in its back*. Instead of wrenching off the head as I expected, the female butcher bird began to pull the feathers from the lower part of the body (the male still holding the bird down) and to disembowel the victim, now and then using its claws in the operation; then after getting a quantity in its beak disappeared in the thick of the hedge. It was then I heard for the first time the cry of the young birds, and knew the position of the nest. After seeing the female go twice with food I ventured to disturb them, and there was the nest, but so artfully concealed by the leaves, &c., that I had actually overlooked it before, although I had examined the very place. The nest contained the five young birds now exhibited, then about a week old. I afterwards made my arrangements for capturing the whole family and the result is before you. I have also brought a portion of the contents of the bottom of the nest, so as to give some slight idea of the enormous quantity of insects and young birds they must consume. There you will see thousands of wing-cases of beetles either whole or fragmentary as well as small bones of birds, chiefly nestlings, enough to fill a saucer of moderate size.

Now, in walking towards the hedge I flushed another bird, and upon looking carefully into the grass I found a nest, which contained three young pipits just hatched, also one egg. This evidently was the family of the bird the butcher had killed, and his song of joy had thus led to his own destruction. I have no doubt that later on both mother pipit and her young ones met with the same fate as the male bird, for on looking for the nest a few days after I captured the shrikes, only the single egg remained.

The pipits construct a nest very quickly, but this must have been done almost under the eyes of the shrikes. Is it possible that they were purposely spared for a time? This would imply a forethought and reasoning power we can scarcely conceive.

Dover.

The Determination of Species of Lepidoptera by examination of their Anal Appendages.

By F. N. PIERCE.

As we grow older we constantly notice changes in familiar objects; changes in animals, changes in insects, in fact as the great poet has written—"Change and decay in all around I see." Some of these changes are real, some are simply changes of name: but why should names change? Is it the progress of education? In insects, the particular group with which we have to deal, we find many changes in the names. I do not intend to say anything about the synonymy and laws of priority, these are better in abler hands than mine; but what I wish to draw attention to, are the changes certain insects have undergone in their names apart from synonymy. We have only to look at the older lists to find that what were considered two species then, have been united as one species now, from the fact of both being bred from ova laid by one parent. Where are now *Epinephele janira* and *jurtina*, *Camptogramma fluviata* and *gemmata*, *Nemeophila russula* and *sannio*, and many others? We find them united under one name, and those whom God joined together are no longer separated in the lists. This has been done by careful study in breeding. In the same way single species have become two, for example: *Caradrina alsines* and *blanda*, *Notodonta dictæa* and *dictæoides*, *Acronycta psi* and *tridens*, have been separated when we found by breeding that although the imagines are so alike the larvæ are different. Then again we find what were considered two or more species differing in coloration and markings, and occurring in distant localities, such as *Lycæna agestis*, *salmacis*, and *artaxerxes*, *Canonympha davus*, *rothliebii*, and *laidion*, from examination of the larvæ, and being bred in a different locality, proved to be local forms of one species. Being a specialist only in lepidoptera, I have been obliged by want of knowledge of other orders, to select my examples from the lepidoptera, but I know similar cases are equally numerous in other orders. All these facts were not found out in a day, but are the result of mutual assistance and careful study; therefore we are a little surprised when we see entomologists, high up on the rungs of authority, discussing the distinctness of a species by the mere markings and size, particularly species in such a closely allied genus as the *Zygænidæ*. Unfortunately, not only is very little known of their earlier stages, but some of them are so rare and difficult to rear, that there

seems at present little opportunity of their being bred, and thus satisfactorily proving their identity. This being so, must we take the colouring, which we know by other species is unreliable and misleading, to say that one species is, or is not, identical with another? Would any of us be guilty of asserting that because we find a hermit crab in a whelk shell, that it must be a whelk? Would we not rather examine it, and finding by its structure, that it was not a snail, come to the conclusion that some unseen circumstance had compelled it to take a covering so unnatural. Hence, when we come to insects so closely resembling each other as *Zygæna meliloti* and *trifolii*, the mere outward form and colouring is not sufficient, we ought to examine deeper into the structure.

With other orders we find men define their species structurally, for instance, the number of joints in the antennæ, the number of spines on the tarsi, and even in the Tineina it is necessary to study the palpi, but in the macro-lepidoptera no such scientific means are adopted for specific distinction. Occasionally we hear of some one "going to study the scales," but as a rule this idea is quickly given up with "it won't work." The late Beeber Bowman Labrey had worked up the scales of butterflies, and completed a life-long work, which was stolen from the railway carriage, while he was on his way to the publishers, and his life was not sufficiently long to re-write and re-figure this work, though with a patience few men possess, he did the great portion of it before his death.

I have examined the scales of the British *Zygæna*, but there is very little difference in them, with the exception of *minos* and *exulans*, in which they are distinct, the others are practically all the same. With a knowledge of these difficulties, some three years ago I determined I would try and find some structure that was specifically constant, and sufficiently distinct to determine one species from another. I have had extreme difficulty in obtaining useful material, and with a very limited time at my disposal to devote to lengthy preparations, it is not surprising that at the end of three years work I have not done a very great deal, but still I think I have done enough to prove that the idea is sound, and simply wants material, time, and care to work it out.

The portions of the insect I selected for my experiments, were the anal appendages of the male insect. These I carefully prepare as transparent objects for the microscope, arranging the parts as neatly and as much in the same style as I could, and when put under the inch objective, the wonderful and extraordinary beauties of these

structures are seen. It is impossible to describe the forms of the various parts, they must be seen to be understood.

Perhaps before going further, it will be as well if I go through a few of the species I have tried. At first I took anything that came to hand, to make myself familiar with the structure of the organs. Then my first real experiment was on the genus *LYCÆNA*, but owing to a want of knowledge, and the difficulty in preparing these specimens, I left them, merely mentioning in passing, the lovely *Lycæna ægon*, the most distinct of the group, the inferior appendage of which takes the form of a most perfectly toothed cockscomb.

I next took the genus *HEPIALUS*—the Swifts. Although these are quite different as far as external appearances are concerned, in colouring and marking, they were well suited to prove the value of my method. The following is a description of what I found; figures would perhaps be better understood:—

Humuli.—*Sup. app. broad, rounded; inf. app. broad and toothed; anal flap short, small, and rounded.

Velleda.—Sup. app. longer, oblong shaped; inf. app. narrow, elongated, toothed; flap longer than *humuli*, oblong rounded.

Sylvanus.—Sup. app. oblong as a peduncle; inf. app. narrow, produced to a point, sword shaped; flap pointed, and very small.

Lupulinus.—Sup. app. bolster shaped; inf. app. pointed and toothed, somewhat similar to *Velleda*; flap broadly pointed.

Hectus quite uncharacteristic of the genus. Sup. app. pointed and produced; inf. app. equally broadly pointed, but rounded at the tip, not toothed; flap similar to *Lupulinus*.

This I considered highly satisfactory. Having the majority of the *TÆNIOCAMPÆ*, I next took this group, the parts of which though more elaborate, were equally distinct;—

Gothica.—Sup. app. simple; inf. app. slender, bent and toothed; flap triangular on peduncle.

Rubricosa.—Sup. app. simple; inf. app. elongated, narrow, cut-off, curved; flap long peduncle, suddenly broadened, and rounded at tips.

Populeti.—Sup. app. antler shaped; inf. app. elongated, narrow, curved, pointed; flap gradually broadened, and cut off at broadest point.

Munda.—Sup. app. antler shaped; inf. app. elongated, curved, broadens and becomes suddenly pointed; flap elongated, not pointed.

* Sup. App.—Superior, or outer appendages.

Inf. App.—Inferior, or inner appendages.

Cruda.—Sup. app. simple; inf. app. long, narrow and beaked; flap very long, and tapering to a point.

The next group I tried were the three large ARGYNNIS:—

Paphia.—Inf. app. oblong, round, covered with rough file-like projections; anal flap much toothed, like a deer's antler.

Adippe.—Inf. app. long and slender, covered with rough file-like projections, slightly bent in the centre; flap like a bird's beak, no teeth, but rough for a short space.

Aglaia.—Inf. app. in the shape of a right angle, very broad at the base, and narrow at the side, only toothed on the margin; flap beak shaped, abruptly pointed, rough on a larger portion than preceding.

When I arrived at this stage, the controversy re *Zygæna meliloti* was at its height. I was very anxious to try this genus, but the great difficulty I had experienced with *filipendulæ*, in getting the different organs sufficiently soft and transparent, made me nervous of getting any satisfactory results; but I started with what I had, and appealed to Mr. W. H. Tugwell for help. This gentleman, though a perfect stranger to me, with true generosity took *meliloti* from his cabinet, and sent them to me, with specimens of *exulans*, thereby completing the whole series of the genus. I cannot allow this opportunity to pass without expressing my extreme gratitude to him, without whose help this paper could not have been completed at present. With the material now at my disposal, I set to work, and in about three months was rewarded by proving to my entire satisfaction, that as far as structure was concerned, the whole of the *Zygænas* are distinct species, there being the widest possible difference between *meliloti* and *trifolii*, substantiating the keen sense of discrimination of the late Henry Doubleday. I would also add here that a short time ago, I was examining the late Alfred Owen's collection, and among his series of *meliloti* is a specimen labelled "bred from a larva sent me from the New Forest by S. J. Capper, A.O." there is no doubt about the species in this bred specimen, which is a typical *meliloti*, and is now in the rich collection of Mr. S. J. Capper of this city. Thus proving that *meliloti* fed away from its native home will still produce *meliloti*.

The anal appendages of the ZYGÆNA contain the following parts sup. app., inf. app., penis collar, a scaly organ covered with file-like teeth and penis, and may be divided into two groups:—

A. Inf. app. produced beyond the flap.

B. Inf. app. very long and slender; collar with large teeth: *Filipendulæ*.

BB. Inf. app. shorter, stouter than preceding; collar small, teeth very small: *Exulans*.

BBB. Inf. app. shorter than preceding, collar larger, teeth much larger than *exulans*; but not so large as *Filipendulæ Meliloti*.

AA. Inf. app. not produced beyond the flap.

C. Inf. app. very stout, slightly curved at the tip; collar small, with a few small hooks drawn out: *Minos*.

CC. Inf. app. shorter, rounder, collar broad, large hooks: *Trifolii* and *Lonicera*.

The hooks on *Lonicera* are larger and bolder than *trifolii*, but although they look very different, it is difficult to describe the difference.

I have worked several other groups, and can safely say in every case the parts examined were sufficient in every way to decide a species.

For the benefit of those who would like to satisfy themselves, I will give particulars of the process I adopted for preparing specimens. I admit the mounting as specimen slides for the microscope requires a great amount of care, and was an end I did not attempt to attain. Though for beauty and elegance of shape, and structure, I consider these wonderful appendages rival the better known though not more beautiful portions of insects, such as the fly's tongue, so generally mounted and shown as slides for the microscope. The females do not seem to have the curious structure of the males, mostly having a simple ovipositor. The male abdomen is first cut off from the thorax, and soaked in potash hydroxide, from a few days to a few weeks according to the density of the chittine, it is then taken out of the potash and put into water; by gentle pressure on the abdomen the parts will fly out, and with the aid of a simple lens, must as well as possible be placed in position, needles, tweezers, &c., being used for this purpose. After being washed for a few hours the object is placed on a slide and again arranged, then a cover glass is placed on to keep the parts extended, and freely dehydrated with absolute alcohol, and only using sufficient pressure on the cover to keep the parts extended. In the course of a few minutes the anus will be quite hard, when it may be removed to essential oil of cloves, where it may remain until convenient time for mounting, I recommend not less than two or three days. For mounting, take a glass slip, on which put a drop of Canada balsam, which must then be heated sufficiently that the balsam will set on cooling (the necessary heat can only be got by experiment, much depending on the stiffness of the balsam. The slide must then be removed from the heat, and the object placed in the still hot balsam. Heat a cover glass a second in the flame, and carefully place

on the object, using as little pressure as possible. If these points are carefully carried out, a successful mount will be the result. If the balsam is not heated enough it will not set, if it is too hot when the object is put in, the essential oil will vaporize, and fill the mount with air bubbles; and experience teaches me it is better to prepare a new specimen, then try and get rid of these enemies to the microscopist.

I am not aware that this subject has been gone into before in the way I have described, but Mr. Tugwell says, he has seen some mention of it in one of the magazines, but I have failed to find it. There was also a paper read before the Lancashire and Cheshire Entomological Society by the late Benjamin Cooke, touching on the anal apendages, this paper I have not been able to see, but I believe he simply examined the part with the aid of a strong magnifying glass, and, as far as I know, no attempt has previously been made in this way for utilizing the anal apendages as a means of discriminating the species of Lepidoptera. I have endeavoured to make myself plain, but dealing with parts, the names of which are almost unknown, it is possible some of my statements may not be as clear as might be. I shall be very glad to give any information in my power, and answer any questions. I shall also be very thankful for any material to work upon, there are many nearly allied species such as *Acronycta psi* and *tridens*, *Bryophila perla* and *glandifera*, *Notodonta dictæa*, and *dictæoides*, *Caradrina blanda* and *alsines*, and many others, which if I were in possession of genuine specimens of the male, I could have an opportunity of examining. There must be lots of damaged specimens lying in duplicate boxes, of no value to the owners, but being capable of being put to true usefulness if they fell into a worker's hand.

143, Smithdown Lane, Liverpool.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 6th, 1889.—The Rt. Hon. Lord WALSINGHAM, M.A., F.R.S., President, in the chair.

The President announced that he had nominated Capt. H. J. Elwes, Mr. F. Du Cane Godman, F.R.S., and Dr. Sharp, Vice-Presidents for the session 1889-90.

The Rev. F. D. Morrice, M.A., of Rugby; Mr. A. Robinson, B.A., of Brettanby Manor, near Darlington; and Mr. H. Burns, of Fulham, S.W., were elected Fellows.

Lord Walsingham exhibited a larva of *Lophostethus dumolini*, Guer., sent to him by Mr. Gilbert Carter, from Bathurst, West Coast of Africa.

Mr. G. T. Porritt exhibited several melanic specimens of *Boarmia repandata* from Huddersfield, and, for comparison, two specimens from the Hebrides. Mr. M'Lachlan remarked that melanism appeared to be more prevalent in Yorkshire and the north midlands than in the more northern latitudes of the United Kingdom.

Capt. Elwes read a paper "On the genus *Erebia*, and its geographical distribution." The author, after referring to the number of species and named varieties, many of which appeared to be inconstant as local forms, made some remarks on the nomenclature of the genus, and suggested that a better system of classification might be arrived at by anatomical investigation. It was stated that little was known of the early stages and life-history of species of this genus, the geographical distribution of which was Alpine rather than Arctic. The author remarked that it was curious that there was no species peculiar to the Caucasus, and that no species occurred in the Himalayas, where the genus is replaced by *Callerebia*: that none were found in the Himalo-Chinese Subregion, and none in the Eastern United States of America. He also called attention to the similarity of the species in Colorado and North-West America to the European species. Lord Walsingham, Mr. Waterhouse, Mr. O. Janson, Mr. M'Lachlan, Dr. Sharp, and Mr. Jenner Weir took part in the discussion which ensued.

Mr. W. Warren read a paper "On the *Pyralidina* collected in 1874 and 1875 by Mr J. W. H. Traill in the Basin of the Amazons."

Mr. C. J. Gahan read a paper entitled "Descriptions of new or little-known species of *Glenea* in the Collection of the British Museum."

Dr. J. S. Baly communicated a paper entitled "Notes on *Aulocophora* and allied genera."—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

January 17th, 1889.—Mr. Hockett, Vice-President, in the chair. Mr. Hanes exhibited *O. macilentata*, *A. suffusa*, and *E. nigra*, from the New Forest. An interesting discussion took place respecting the habits of bats, in connection with their flight during the daytime; several members gave accounts of their observations on this matter, but no apparent conclusion was arrived at, it being considered very doubtful as to whether bats, under certain circumstances, really fed in the daytime or only took flight when disturbed. All the accounts agreed, however, that when bats were seen during the daytime, either in sunshine or dull weather, the flight was uniformly slow and regular, and no member had ever seen a bat fly by day in an erratic or frightened manner.

February 7th.—Mr. E. Cooke, President, in the chair. Mr. Cooke exhibited two species of Birds of Paradise, *P. Wallachii* and *P. Wilsonii*. Mr. Gurney, Australian lepidoptera and coleoptera, including a series of *Vanessa* similar to our *V. cardui*, but having a blue centre to each of the spots on the hind-wings. Mr. Lusby, a series of *V. maculata*, including several varieties, and a series each of *S. tipuliformis*, *S. myopi-*

formis, and *S. culiciformis*. Mr. Hanes, a series of *A. litura*. Mr. Hockett, specimens of lepidoptera from Mexico, including *Morpho ino*, *M. cyprus*, &c., these insects being remarkable for their brilliant colour. Mr. Battley, *T. rubricosa*, *C. borcata*, and *C. suffumata*, also specimens of fossils from lias clay (Lyme Regis), chalk (Dover), London clay (Southend), and red clay (Folkestone.) In coleoptera, there were several interesting exhibits: Messrs. Clark and Cripps' being the most noticeable; included in Mr. Clark's was a fine male specimen of *Astynomus ædilis*, from Scotland, also from the same locality, a series of *Clerus formicarius*, *Hylobius abietis*, *Chrysomela hæmoptera*, *Coccinella oblongo-guttata*, &c. Mr. Cripps exhibited over 100 species, the results of last season's collecting, from Esher, Rainham (Essex), Brokenhurst, and Working, comprising—*Polyopsis præusta*, *Stangalia armata*, *Phyllobius calcaratus*, *Mordellistena abdominalis*, several *Donaciæ*, *Luperus circumfusus*, *Balaninus nucum*, &c. Mr. Lewcock exhibited *Molytes germanus*, which Mr. Clark stated he had received, with three other specimens, from Wisbeach. Mr. Hockett announced that he had bred a specimen of *N. hispidaria* on February 2nd. Mr. Clark mentioned a case in which a flower-pot containing pupæ of this species had been kept exposed to the weather, and when recently turned out it was found that all the insects had emerged and escaped.—EDMUND HANES and G. A. LEWCOCK, Joint Hon. Secretaries.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

January 24th.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Rev. Jos. Green, M.A., F.E.S., was elected a member. Mr. W. H. Tugwell exhibited a fine bred series of *Deilephila galii*. Mr. J. A. Clark, *Acidalia immorata*. Mr. Adye, forms of *Argynnis paphia*, var. *valezina*. Mr. Tutt, on behalf of the Rev. C. A. Sladen, a black and almost spotless variety of *Strenia clathrata*, a melanic specimen of *Agrotis simulans*, taken in the Hebrides.

The Treasurer then read an abstract of his accounts for 1888, shewing a balance of £24 15s. od. in favour of the Society. The Council's report was read by the Secretary, after which, the following gentlemen were elected as officers for 1889:—Mr. T. R. Billups, F.E.S., *President*: Mr. J. T. Carrington, F.L.S., and Mr. W. H. Tugwell, *Vice-Presidents*; Mr. E. Step, *Treasurer*; Mr. W. West (Greenwich), *Curator*; Mr. D. J. Rice, *Librarian*; Mr. H. W. Barker, F.E.S., *Secretary*; Mr. H. J. Turner, *Assist. Secretary*; Messrs. R. Adkin, F.E.S., C. A. Briggs, F.E.S., T. W. Hall, F.E.S., J. Henderson, W. Manger, J. R. Wellman, and J. Jenner Weir, *Council*.

February 14th.—The President in the chair. Mr. A. C. Vine was elected a member. Mr. Adkin exhibited examples of *Arctia caia* from Morayshire and Kent, and *Hydræcia nictitans* from Morayshire. Mr. Tugwell, a marked variety of *Chærocampa porcellus*, the usual deep rose colour of the wings being replaced by a pale olive green, shaded with grey markings; also a variety of *Deilephila galii*, bred from larvæ taken at Deal, the usual characteristic dark olive green markings being replaced by dull grey, whilst the pale streak that runs from the inner margin to the tip of the wing being obscured and dull in colour, inferior wings of a dull pale grey, lacking the rich rose shade at the anal angle. He remarked that he had bred two of this variety,

and to the present time seventy of the type. Mr. Turner, light forms of *Zygana filipendulæ* from Reigate. Mr. C. A. Briggs, specimens of *Triphana comes* and *T. pronuba* from various localities. Mr. Weir, three male and three female specimens of a butterfly he had received from the Falkland Islands. They were of the same genus as our well-known *Brenthis selene* and *B. euphrosyne*, and were apparently closely allied to the Chilian *B. anna*. Mr. Weir stated that he had not yet been able to make the necessary references, but he was at present disposed to regard them as a species new to science, and if upon future examination he found his view correct, he proposed for them the name of *Brenthis Falklandica*. He thought the specimens were sexes of the same species, although the shape of the upper wings differed materially, and the difference in the colouration of the underside of the underwings was considerable, but on the other hand he could detect no difference in the distribution of the colour on the upperside of either of the upper or lower wings. It was interesting that palearctic and nearctic genera of lepidoptera reappeared at the southern part of South America, which were quite unknown over a vast extent of the intermediate latitudes. But it should be borne in mind, that there was in the American continents an almost continuous chain of mountains from the Arctic Ocean to the Straits Magellan, which might have formed a connected temperate region, by which the migration of species from the north to the south was effected at a time when the temperature of the earth was different to that which now obtains. Mr. Carrington, parasites from larva of *Acronycta alni*. Mr. Tugwell, on behalf of Mr. Porritt, two very dark specimens of *Boarmia repandata*. Mr. Weir read a letter from Dr. Rendall, who is now resident at Bathurst, Gambia. Observations were made upon a reported case of stridulation by a species of *Vanessa*, and a discussion ensued.—H. W. BARKER, Hon. Secretary.

Our Pterophori.

By C. A. BRIGGS, F.E.S.

Our Plumes have been got into such a maze of confusion and uncertainty from hasty assertions, tardy corrections, and assumptions from insufficient data, that the only thing that would seem to be considered clear, is that we know more about the Continental species which we do not catch, than is known by the Continental entomologists who see them in every stage, and certainly more than we do about our own species.

This confusion is particularly marked with regard to those three groups of Plumes, of which, so far as our species are concerned, *Teucrui*, *Bipunctidactylus*, and *Gonodactylus* (or *Trigonodactylus* as we used to call it), respectively form the central figures.

As regards the first group, consisting of *Distans*, *Lætus*, *Pilosellæ*, *Hieracii*, *Teucrui*, and *Parvidactylus*, the latter may be dismissed as

abundantly distinct and sufficiently well known. Of *Hieracii* and *Lætus*, no authentic records of captures in England exist, ours being all *Teucris* and *Distans* respectively, and the question of the identity or non-identity of *Lætus* and *Distans* does not affect us. Can any of your readers refer me to any published records of *Distans* from Folkestone, or of *Brachydactylus* from Perthshire, Deal, or Folkestone. *Pilosellæ* presents some difficulties, from the fact that most of the specimens so called, are either small *Teucris* or large *Parvidactylus*, different as these are from the true *Pilosellæ* of our lists, which so far as is recorded, is entirely confined to Mickleham, and has not, I think, been recently taken. I hope this year to attack it in its old haunts (if I can but learn in what part of Mickleham it occurs), and see in what respect, if any, and to what extent it differs from *Distans*, except in its darker colour.

With regard to *Teucris* (or rather *Britaniodactylus*), it should be remembered that *Heterodactylus*, the name now advanced by Mr. South, was not Haworth's but De Viller's name, and a solitary specimen of Haworth's, so labelled, cannot be deemed sufficient evidence that our *Teucris* is De Viller's *Heterodactylus*, so *Heterodactylus* must retire again into that obscurity from which it is a pity that a so long disused and forgotten name was ever dug out to make confusion worse confounded.

As regards the second group, containing *Bipunctidactylus* (or *Serotinus* as we are bidden to call it), *Aridus*, *Plagiodactylus*, *Scabiodyctylus*, *Loewii*, and *Hodgkinsoni*, each in turn has been announced as distinct, with such a flourish of trumpets, and air of absolute certainty, that it seems hard to be now told to believe that we have but two real species in the whole lot. *Bipunctidactylus* and *Plagiodactylus* have been clearly proved to be different in their larvæ, and in their food, as well as in appearance, and have equally conclusively been proved to be identical, which no doubt will make the matter clear for the future.

As regards the third group, we learnt from *Entomologist*, XV. p. 34, that *Tæniadactylus* was distinct from *Zetterstedtii*, from which it could be at once told by its narrow wings, the structural character of which seemed to indicate its belonging to a different sub-genus. Now, structural character and all, goes by the board, but departing, leaves behind it a hateful legacy, in the shape, as far as it can be traced, of a hint that our *Zetterstedtii* (or *Zetterstedti* as it seems now to be called), is not Zeller's *Zetterstedtii* at all, but that our *Zetterstedtii* is *Nemoralis*, and Zeller's *Zetterstedtii* is our old *Gonodactylus* after all, which we are told is the same species as *Farfaveilus*, which has apparently but just escaped from being called identical with the moribund *Tænia-*

dactylus, *Tesseradactylus* happily being not yet drawn into the vortex of speculative theorisation.

The synonymy of this group being supposed to be clear and scientific, we may now arrange our cabinets accordingly, until a few fresh continental types occasion the next bouleversement.

53, *Lincolns Inn Fields*.

Notes and Observations.

DEILEPHILA GALII IN IRELAND.—I observe in an article on "The Blown-over *v.* the Climatic Influence Theories," Dr. Corbett says with respect to *D. galii* that "a few were taken in Ireland." (*Young Naturalist*, Vol. X., p. 32. I was under the impression that the only specimen of *D. galii* ever taken in Ireland was caught last summer at Howth, and I would feel greatly obliged if you can ascertain from Dr. Corbett what others he refers to in this observation.—GEO. C. HART, 14, Lower Pembroke Street, Dublin.

ABNORMAL HYBERNIA PROGEMMARIA.—I have a specimen of *Hybernia progemmaria* with male wings and female antennæ on one side, and female wings and male antennæ on the other side; it was found near Stalybridge.—JOSEPH CHAPPELL, 29, Welbeck Street, Manchester.

ABNORMAL COLEOPTERA.—Imperfect coleoptera are often very interesting to me when found in that state in their haunts, minus a portion of a leg or antennæ. In the former case they are easily detected in active species, as they describe a curve in running, in fact it is almost impossible to run otherwise. I have often captured specimens which had evidently emerged from the pupa minus a tibia or tarsi; in species with red or testaceous femora or tibiæ, the femur, when minus the tibia, are invariably tipped with black or pitchy, also when several joints of the antennæ are minus in species with red or testaceous antennæ the tip of joint of the imperfect antennæ is often tipped with black or pitchy, from that I infer that the specimen has acquired the dark colour to the apex of the imperfect one in the pupa state. I have also a specimen of *Pterostichus vulgaris*, which was picked up in Cumberland by a friend of mine, who requested me to supply him with a bottle of laurel into which he would put any specimens he met with in his rambles. It has the intermediate trochanter on the left side not so fully developed as on the right, the femur is

slightly shorter, the tibia and the tarsi are one-third shorter than those on the right side; the posterior trochanter on the left side is smaller, the femur is about one-third shorter and less fully developed, the tibia is one-third shorter, and the tarsi one-half shorter than those on the right side. *Apion violaceum*.—I have one which was captured by Mr. Ludgrove, of Nottingham, of which the disc on each elytron are glabrous, the third and fourth stria are recurved into each other at the basal and apical ends of the discs. *Sitones tibiale*.—I obtained a specimen by sweeping on Kinder Scout, about 1878, having the posterior angles of the thorax dilated, thus forming an acute tooth at each posterior angle.—JOSEPH CHAPPELL, C-on-M., Manchester.

The Classification of Coleoptera Historically Considered.

By W. E. SHARP.

PART II.

In a former number we attempted to trace the rise of the study of Entomology, and to show how the order Coleoptera especially had been treated by various naturalists, from the time of Aristotle to the the beginning of the present century. We briefly indicated what had been the part taken by the great masters, Ray, Linnæus, and Fabricius, in the development of our knowledge of this order, and showed that as regards its classification, naturalists were at that period pretty well divided into the schools of tarsalists and antennalists.

But one name that appears at the beginning of this century marks a distinct epoch. We refer to the Abbè Latreille, who, considered solely as an entomologist, is perhaps the most considerable that the world has yet seen. He demands more detailed notice. Pierre Andre Latreille was born at Brives in 1762. He took orders and finally became Abbè of Brives. In his clerical character he incurred, with the rest of his order, the enmity of the Republic, and narrowly escaped transportation to Guiana, but the entomologist saved the priest. The story is well known, how imprisoned in Toulon, Latreille perceived a strange coleoptera appearing from a crack in the wall of the cell in which he was confined, how he, assured of the rarity of the insect, by its means secured the interest of a powerful brother entomologist, through the medium of the prison doctor, and how his friend obtained his release and pardon, and thus secured an honoured old age for the

Abbè, and for the world the detailed result of years of the most careful observation and accurate judgment.

Latreille's first work was published in 1796, and enumerated 148 genera of coleoptera. In 1806 appeared his most important book, "Genera Crustaceorum et Insectorium," and many notable works on Natural History occupied the intervening years. When we turn to the coleopterous classification of Latreille we find him *facile princeps* among the tarsalists to all appearances, for he adds to Olivier's four sections of *Pentamera*, *Tetramera*, *Heteramera*, and *Trimer*a, two more *Dimera*, to accommodate the, as he thought, two-jointed *Poelaphidæ*, and *Monomera* for *Clambus armadillo*. But although Latreille based his classification nominally on tarsal development, he was by no means unconcious of the arbitrary character of such a system: he says himself "Articulorum tarsorum progressio numerica decrescens in methodo naturali non admittenda," and we find, although he makes tarsal distinctions determine his major groups, he forms minor ones of a more natural character which have since almost effaced the superior tarsal divisions in which they were included. Thus taking a modern classification, say that of Cox for example, we find the minor groups of Latreille, *Adephaga*, *Brachelytra*, *Palpicornia*, *Clavicornia*, *Lamellicornia*, *Sternoxi*, *Malacoderma*, which are included in *Pentamera*, all form the major groups of the modern system, and equivalent in grade to *Heteromera*, which is Latreille's second major division, and includes minor ones which we not recognize. You will thus see the extreme value which I think should be attached to this work of Latreille's, for he inserted between the tarsal arrangement and the generic, new divisions which had the merit of being obviously natural and which opened the door to modern families and sub-families. In fact Latreille was really the originator of the family as a scientific group, yet although a master of generalization, he was by no means weak in detail. A glance at a specific list will show to how many species the initials "Lat." are affixed, and the following are a few of the genera indispensable now, which owe their origin to this master: *Bembidium*, *Lebia*, *Loricera*, *Nebria*, *Panageus*, *Licinus*, *Harpalus*, *Clivina*, *Caymindis*, and *Haliphus*.

Latreille having been recognized by the whole of Europe as the first of living entomologists, and having been created Chevalier de Legion d'honneur, died in 1833, old enough to see the great English school of systematists formed by McLeay and his successors.

But long before the death of Latreille, entomologists were increasing in every European country, and it will be more convenient to

refer to those of each nationality as they appear for the next few years. Sweden takes the lead, and we think it a curious fact, and one worth notice, that although Europe owes most of her literature and nearly all her art to the Latin peoples, that careful and accurate study of nature which distinguishes the present century, seems to have been the special heritage of the Gothic races. Italy, that fountain and origin of all the humane arts, can show as entomologists only a Scopoli and a Bonelli, while as far as I am aware the race that produced a Murillo and a Cervantes, has never numbered among her sons one single name that has added aught to our knowledge of nature. Yet Sweden, the Ultima Thule of Europe, enriches mankind with a Linnæus, and we find inscribed in the famous University of Upsala, a long roll of entomological worthies from De Geer to Simpson. Therefore to Sweden we will first turn and find Leonard Gyllenhal—a singular character indeed. An officer in the king's body-guard, his was not a profession in which, one would suppose, there could be found either room or inclination for the study of coleoptera, yet we see this old soldier at the age of 85, producing a most minute description of insects, and especially coleoptera, for the great work of his friend and neighbour Schönherr. His own principal book was the "*Insecta Suecica Coleoptera sine Eleutherata*," published in 4 volumes in 1808. His collection was presented to the Upsala Scientific Society, where very probably it is now to be seen.

Schönherr, to whom I have just referred, was a member of the Stockholm Academy. He, as we have seen, with the help of Gyllenhal, published in 1806, his "*Synonymia Insectorum*," a work more of compilation than one that marks any new departure in classification, but which contains descriptions of no less than some 3000 species of Rhyncophora alone.

Among the Swedes we must also mention the parish curé Frisström and the Professors Thunberg, Bilberg, Bohmacum, and Fabräus; Ahlstedt too of the Finnish Abo, most northern of cities, all of whom have contributed their quota of species to our own lists.

We next turn to Russia, at that time so far behind the civilization of Western Europe, and find that Moscow had its Imperial Society of Naturalists, of whom we mention the Count von Mannerhiem, a great authority on the Geodephaga, and whom we include in this era although he appears quite at the end of it, about 1835; in St. Petersburg, too, Entomology was studied at the Academy of Sciences, and we find there Escholtz constructing new genera of Sternoxi, and even in Odessa we hear of the Professor Nordmann studying the coleopterous fauna of the South.

In Germany, during these years, we have Gravenhorst, who specially studied the Brachelytra, and Germar, who edited a magazine devoted to Entomology in 1815, possibly a successor or competitor of Peligero Müller also, and the authors Goldfuss and Willbrand, who with Oken, published a natural history for schools, in which the Coleoptera are divided into three sections: *Pentamera*, *Tetramera*, and *Heteromera*, each of which are in this manual made equivalent in rank to each of the orders Diptera, Hymenoptera, or Lepidoptera, which together form the second division of insects, Coleoptera being the first.

But if Germany seemed to be falling behind the more northern nations at this time, one Italian and several French entomologists were producing important works. The Italian we allude to was Bonelli, member of the Academy of Turin, who, in 1809, divided *Carabus* into no less than 55 genera. Latreille's genera were, we remember, published seven years previously, so that Bonelli only added a good deal to what Latreille had done. It is to Bonelli, however, that we owe the following well-known genera of Geodephaga: *Callistus*, *Anchomenus*, *Chlœnius*, *Amara*, *Blethisa*, *Calathus*, *Dyschirius*, *Dromius*, *Demetrius*, and *Polystichus*. Bonelli was very active for the next ten years, principally among the Geodephaga, in proposing new genera and determining new species, but we do not find him initiating any new method of classification; in fact at this time Latreille was the acknowledged authority in classification.

Before proceeding to consider the next notable French coleopterists, viz.:—the Count De Gean and Boisduval, we must refer to some of our own countrymen who slightly preceded them. We find a considerable gap after the death of Ray, which it must be remembered took place in 1705, and we can discover no name of considerable importance, during all the eighteenth century, in the ranks of English entomologists, but in 1802, Dr. Marsham published his "Entomologia Brittannica," and holds therein to the Linnean classification, admitting only sixteen new genera. A few names, however, which you will find in the lists having the abbreviation "Marsh" appended to them, form the doctor's slender title to fame and posterity, and we must proceed to Leach and M'Leay to Stephens, Westwood, and Kirby, to arrive at what we may fairly call the English school.

Leach, another doctor, and an Edinburgh man, as early as 1815, wrote in the "Edinburgh Encyclopædia," a synopsis of Coleoptera. He includes 332 genera, and the following are some that he first determined; *Laccophilus*, *Linnebius*, *Typhaeus*, and *Scapisoma*. Dr.

Leach was so far independent of his foreign predecessors as to arrange, as his friend M'Leay tells us, *Pselaphidæ* next *Staphylinidæ*, which is in direct antagonism to tarsal affinities.

But this Wm. M'Leay, another Scotchman, invites our more particular attention. In a paper read before the Linnean Society, Feb. 1st, 1825. M'Leay demonstrates the fallacy and artificiality of the French tarsal system of classification. This is a most interesting departure and discovers M'Leay in the light of a true naturalist. In his own book, "*Horæ Entomologiæ*," which was published in 1819, he not only attacks this system but elaborates another on an entirely new basis, rejecting the tarsal divisions, as he explains, not only because they were arbitrary, but because they were founded on mistaken data. M'Leay, in the spirit of a true modern philosopher, has resourse to embryology to discover a true natural order. He takes the larvæ, a stage no one before had ever thought of investigating, and according to those embryonic characteristics therein displayed, forms his groups; and to fit in with a larger theory, in which he associated all nature, and to which we must refer again, he formed in this way five divisions of the order. These were as follows:—

1. CHILOPODIFORM, that is such beetles whose larvæ are carnivorous hexapods, in which are included *Adephaga*, *Palpicornia*, *Brachelytra*, and part of *Clavicornia*.
2. CHILOGNATHIFORM, or beetles with herbivorous hexapodal larvæ, including *Lamellicornia*, a part of *Clavicornia*.
3. ANOPLEURIFORM, whose larvæ are herbivorous hexapodal, and antenniferous, which includes what other systematists call *Eupoda*.
4. THYSANURIFORM, similaar to preceding, but with anal appendages to larvæ, which the *Anopleuriform* are without, principally *Heteromera*.
5. VERMIFORM, whose larvæ are worm-like, and destitute of legs or antennæ, among these are *Rhynocophora*, *Longicornia*, and part of *Heteromera* and *Malacoderma*.

Now it is evident that the lines of cleavage indicated by such a classification as this traverse the group on quite another plane than that afforded by mature differentiation; read in the light of recent science it might suggest more natural affinities, but at least it discovers in M'Leay a singular insight into the importance of embryology in tracing development.

Of a similar import is this naturalist's theory of circular groups, he saw how impossible it was to arrange the natural order in linear series. How, for example, if the *Geodephaga* show a transition to

Brachelytra through the *Lebiadæ*, it leads off towards the *Hydradephaga* by affinities in *Bembidium* and *Haliphus*, and so M'Leay conceived the whole organism of nature as arranged in circles of five members, each asculant on one another. Out of this grew the theory of analogues, and here the pedant seems more obvious than the philosopher, although M'Leay need not be held responsible for the lengths to which his disciple Swainson carried this idea, he certainly originated it. In Swainson's hands it became almost absurd and exceedingly complicated, every part of creation is analogous to some other part, the series are endless, coleoptera becomes an analogue of rodentia among mammalia, and of the tortoises among reptilia; and more, every division and sub-division of coleoptera became analogous to similar divisions among every other order, and this not as the result of some fortuitous arrangement, but as inevitable as the formation of the atoms that build up a crystal. Of course this strange theory breaks down because all the circles have to be arranged in quinnary terms, and this iron-bound numerical conformity is totally at variance with every natural law. But when M'Leay descends from these flights of imagination he does good lasting work. To Leach and M'Leay, principally M'Leay, are due nearly all our modern families, such as *Carabidæ*, for the other minor divisions of sub-families, and the like, Stephens and Westwood are mainly responsible.

Stephen's magnificent work was published in 1828, and he follows Clairville's general division of insects by oral organs. His treatment of coleoptera is to some extent independent, dividing it as he does into seven sections, which are not at all in conformity with those known before, or any that have been accepted since. The second of these sections he calls *Rhyphophaga*, which includes *Palpicornia*, and part of *Clavicornia*. Then there are three or four sections which he does not distinguish by any special name, and last of all come *Brachelytra*, Stephens evidently seeing in that group an approach to the next order of *Dermaptera* or *Euplexoptera*.

But in the work of Professor Westwood we reach the climax of system. Westwood published his classification in 1839, eleven years after the work of Stephens. We speak of this as the climax of classification because this author contrived to embody in his own some part of nearly all the systems that preceded him. He adopted M'Leay's refutation of the diminishing tarsal plan, but re-created the same groups under the modified names of *Pseudotetramera* and *Pseudotrimera*. He accepted M'Leay's larval nomenclature for two or three

sub-divisions, and made several new ones of his own, such as the division of *Heteromera* into *Trachelia* and *Atrachelia*; but broadly he may be considered a tarsalist, and a follower of Latreille and De Gean, and his sub-divisions are so many and complicated, that he is forced to invent fresh designations of divisions, and contrived to sub-divide to the following extent: order, tribe, sub-tribe, stirps, race, sub-race, family, sub-family, legion, division, genus, and species.

And as in Westwood classification seemed to acquire its most complicated form, it will be unnecessary to follow its course further in detail, for since his day not only has no entirely new system been proposed, but our ideas as to the very meaning and value of classification have been entirely changed. We need only therefore refer to Kirby, Curtis, and Waterhouse, in England, to the Count de Gean, Boisduval, Lacerdaire, and Meelsant, in France, and to Burmeister, Erichsen, and Redtenbacher, in Germany, as authorities to whom we owe much; who have discovered new species, formed new genera, inaugurated new families, but who have worked principally on lines already laid down, who have filled up the skeleton maps of others, and to whom we cannot attribute the origin of any new generalization, or the development of any special theory of creation. These have all added their quota to the sum of human knowledge. The Linnean order coleoptera of a century back, with its 30 genera and 900 species, has become a vast system, with its intricate and infinite sub-divisions, and its estimated 80,000 diverse forms. But as that century closed, a new era as regards our view of nature dawned, for, as we said before, classification took a new import and a changed value.

Before the Darwinian theory of natural development startled the scientific world, all men regarded the visible creation, as it were as one plane; as they beheld it, so it had been in the beginning, and so it ever would be, each form was unaltered and unalterable, species were synchronous, and had been created above time and in one gigantic comprehensive act. Thus it was that to such minds a true classification became as it were a key wherewith to decipher the dark hieroglyphic of nature, and to unfold the secret plan of the Creator. Hence we have M'Leay with his theory of analogous pentagons, and Westwood with his elaborated affinities. These men seem all groping in the dark, the mystery of life refuses to become plain to their eyes or resolve itself into any appreciable harmony. But for us to-day an Œdipus has arisen, and the riddle of existence in some sort read; and it seems to us that if we ever find a true natural order it must be a chronological one. Yesterday was not as to-day, nor is

to-day as to-morrow will be. We know that all the life we see around us is but a passing phase of time, that what we call species own no such quality as endurance, and that perpetual change is implanted in every natural form. We see from our brief point in time, some few branches and twigs of the great tree of life, but its roots are hidden in the abyss of ages, and of its ultimate leaf and flower we cannot even conceive. And so, when in the light of such knowledge, we consider the relation of those similar forms we distinguish as species, we are led to conjecture that it is time and time alone that sunders form from form; that if we could see back into the æons, we should discern some shape that united species with species, some type in which families were blended in one. That taking for instance the order we are considering, we might find one form which united all the Geodephaga in itself, nay more, some insect creeping on the shore of some dim Silurian sea, which bore in its own fabric the potentiality of all coleopterous development. To trace the lines of Genesis, to trace back the devious course of specialization of organ, this must be, we think, the difficult task of future systematists. The exact form which may have united Brachelytra and Geodephaga, to take two obviously natural divisions, will probably be for ever hidden from our eyes, but we can to-day trace their approximation, and guess that *Dromius* and *Lebia* may be ages older than *Carabus* or *Cicindela*, because they point back to a divergent group, just as the nearer a branch of a tree approaches to union with a divergent branch, of necessity the older it must be, for growth takes place at extremities, and complexity increases with time. So again it might with some show of reason be suggested that the Brachelytra were the oldest of all the Coleoptera, because they approximate most to the Dermaptera; but this view might be again modified by embryological data, as Vermiform are considered by many as undoubtedly lower than Hexapodal larval forms. For divergent groups, as we have tried to explain, are united not in linear but in ramific order, by the lowest terms of each, not by the highest of the inferior group approximately to the lowest of the the superior. Take, for example, the two great sub-kingdoms, Vertebrata the superior, and Articulata the inferior. The lowest eel which comes at the bottom of the Vertebrata, could not be more unlike a *Cicindela*, which comes about the top of Articulata, but it approaches closely to the Vermes or worms, which come at the bottom. So it is with species, to discover their affinities it is necessary to study their lowest phase, and that in the individual is the embryo. Even as in the human embryo we recognise the links which bind us to a meaner

clay, so in the embryo of the sagacious ant, the highly developed beetle, that is, their larval form, we discern the origin of their being, and the affinity which connects them with the worm. But we are pursuing a path that leads to heights too steep and too hard for us to follow; enough has been said, however, to indicate what it seems to us will be the lines of the scientific classification of the future. But the M'Leay of that future has yet to arise. Since the time of Westwood, the tendency has been to a simpler, rather than to a more complex classification. Taking the catalogue of Dr. Sharp, or "Cox's Manual," as instances of the modern system, we find we come back pretty nearly to the French Abbè, released from his discredited tarsal system. We call our main divisions Geodephaga, and the rest, and of these it was Latreille who first proposed the names Palpicornia, Clavicornia, Brachelytra, Lamellicornia, Sternoxi, Malacoderma, Rhyncophora, and Longicornia; Heteromera we owe to Olivier, and Geodephaga and Hydradephaga to M'Leay, or if we unite them and call them Adephaga, to Clairville, while Phytophaga is a name first used by Kirby. We are not unaware that our most recent authorities on the Coleoptera do not appear to lean to a more simpler system, but rather the reverse, and we cannot do better than close this paper by a quotation from the preface of a great work, which being published only last year, may be taken as the last *ex Cathedra* utterance on the subject. Canon Fowler writes:—"In fact our knowledge of "the Coleoptera, their relations to one another, and the proper "positions they ought severally to hold, may be said to be as yet in "its infancy, except for a few broad lines that are followed by all, "their classification appears to be more or less artificial, and too "often a matter of taste and convenience rather than of scientific "accuracy."

The Determination of Species of Lepidoptera by examination of their Anal Appendages.

By C. A. BRIGGS.

Mr. Pierce's revival of the old idea of determining species of lepidoptera by means of the anal organs of the male, will, I fear, lead to no better results than it has hitherto done. Few, I am afraid, now study Dr. Buchanan White's careful paper on the genus *Oporabia*: still fewer, I expect, will follow Mr. Pierce into the wider range he

has opened, particularly as there must first be a consensus of opinion among entomologists as to whether such differences would afford a sufficient basis for establishing specific rank. Passing over the question so much fought out in old days as to whether the male or female should be regarded from the superior point of view in determining species and names, and whether therefore to depend upon the male alone is not radically wrong, the difficulties of Mr. Pierce's method will deter most entomologists. Few have the time and appliances, and still fewer the necessary patience and delicacy of touch to enable them to carry out the experiment on a sufficiently large scale to be of any use.

With regard to Mr. Pierce's paper, a few points naturally suggest themselves, on which perhaps he will give us some further information, for most of us I fear are in outer darkness on the matter.

The first is whether any difference of appearance in these organs, from shrivelling or otherwise, would arise in older and consequently drier specimens. The next is whether any difference could be caused by pairing; and the third question, depending on the previous ones, is whether any attempt was made to see that all the specimens experimented on were of the same age, and that all either had or had not paired.

Will Mr. Pierce further tell us the number of specimens of each species experimented on, and also whether in each species the anal organs of each specimen were identical, or whether they showed any tendency to variation. We might then judge how far the experiment may be considered an exhaustive or even representative one. I confess to a feeling of hope that no large number of *Exulans* have been sacrificed to the knife and potash hydroxide.

As regards the *Zygana*, I think that the plan is practically useless. In this group our difficulties usually arise in the case of individual specimens, and it would be rather too heroic a method of resolving our doubts if we had to submit our specimens to the dissecting knife—the remedy would indeed be worse than the disease.

Mr. Pierce, although he had in view the *Trifolii* and *Meliloti* controversy, and although he states that the anal organs of these show the widest possible difference, unfortunately omits to describe those of *Meliloti*, but says that it is difficult to describe the difference between those of *Trifolii* and *Lonicera*, so we seem after all to be much where we were.

One statement of his should not pass unnoticed. He tells us that very little is known of the earlier stages of the *Zygana*. This is a

very grave mistake. The whole of our *Zygenidæ* are not only thoroughly well known in all their stages, but are fully described and figured by Continental authors of such lasting renown as Hubner, Esper, Ochsenheimer, and others. Surely Mr. Pierce does not carry insular prejudices to such an extent as to ignore these authors. But even if he does, our own writers have described, and for a great part figured in their various stages *Filipendulæ*, *Lonicera*, *Trifolii*, *Meliloti*, and *Nubigena*, so that the only one left for us (if we exclude *Nubigena* var. *Minos*) is *Exulans*, of whose specific distinction no doubt has ever arisen.*

Again, that a specimen of *Meliloti* was bred by the late Mr. Alfred Owen, from a larva taken by Mr. S. J. Capper, by no means proves that *Meliloti* fed away from its native home, will still produce *Meliloti*. No doubt Mr. Capper will tell us in the *Young Naturalist* the real particulars, and perhaps describe the larva, but I fully expect to hear that the larva when found and sent away was pretty well full-fed, in which case it had fed during the end of the previous summer and the autumn, had hibernated, and fed up in the spring, in the place in which it was found and therefore nearly, the whole of its larval existence was passed *in* its native home, and not *out* of it as Mr. Pierce suggests.

It is to be regretted that no plate accompanied Mr. Pierce's paper. I have, however, through the kindness of Mr. Tugwell and Mr. Webb, seen two sets of explanatory sketches, and while entirely withholding any opinion, as we have not at present sufficient data on which to base one, I must confess that the results appear sufficiently surprising and interesting to render further enquiry most desirable.

55, *Lincolns Inn Fields, London.*

By J. JENNER WEIR.

Mr. F. N. Pierce, in his paper inserted in the March number of *The Young Naturalist*, has done well in calling attention to the importance of the genital armature of lepidoptera, but he seems to be quite unaware that the literature on the subject is extensive.

In "Transactions of the Linnean Society, Second Series, Vol. I., Zoology," p.p. 357—369, will be found a paper read by F. Buchanan White, M.D., F.L.S., on 21st Dec., 1876, on "The Male Genital

* All the Burnetts except *Meliloti*, and including both *Minos* and *Exulans*, are figured in the second volume of "Buckler's Larva," published by the Ray Society.
—J.E.R.

Armiture in the European Rhopalocera." This excellent paper is accompanied by three plates, on which nearly the whole of the European Rhopalocera are dealt with, and the anal appendages of each figured in different aspects.

In Mr. Scudders' "Butterflies of the Eastern United States," now being published, already, in Plate 33, about 40 figures of these parts are given; and in Messrs. Godman and Salvin's "Biologia Cartrali-Americana Lepidoptera Rhopalocera," great use is made of the differences in the anal appendages of the male insects.

The late Mr. P. H. Gosse also wrote on the subject. The fact really is that more and more attention is constantly being given to the structure of these parts.

Chirbury, Beckenham, Kent.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 6th, 1889.—The Rt. Hon. Lord WALSHINGHAM, M.A., F.R.S., President, in the chair.

The Rev. W. F. Johnson, M.A., of Armagh; the Rev. C. F. Thornehill, M.A., of Burton-on-Trent; and Mr. C. R. Straton, F.R.C.S., of Wilton, were elected Fellows.

Mr. F. P. Pascoe exhibited several specimens of the Saüba Ant (*Ecodoma cephalotes*), from Parà, carrying portions of dried leaves. It seemed questionable whether the leaves were collected by the Ants for the purpose of making their nests or for the sake of some fungus which might be growing on them.

Mr. Jenner Weir exhibited, and read notes on, specimens of a Butterfly (*Tirumala petiverana*), from Mombaza, Eastern Africa.

Mr. J. H. Durrant exhibited a living larva *Cossus ligniperda*, which had entirely lost its ordinary colour and had become first pink and then white. He attributed the change and subsequent loss of colour to the fact that it had been deprived of its natural food and fed for eighteen months on pink paper, with which the box in which it was kept was lined, and subsequently on white cardboard. Mr. M'Lachlan remarked that the most extraordinary peculiarity about this larvæ, in addition to the colour, was the absence of the usual odour of *Cossus*. Lord Walsingham observed that it was questionable whether the colours of the larvæ were dependent on the colours of their surroundings, or whether they were affected by the contents of the intestinal canal. Prof. Meldola said that the caterpillar exhibited having eaten the pink paper had most probably become dyed by the colouring matter, and he did not think the observation had much bearing on the question of the protective colouring of caterpillars. It was well known to physiologists that certain dye-stuffs

could be introduced into the tissues of animals by mixing the colouring matters with the food, and paper was frequently stained with coal-tar dyes such as rosin, magenta, &c., so that it was simply a case of direct dyeing of the larva. Mr. W. White observed that two extra forms of a larva might often be found feeding side by side on the same tree or shrub, so that the colour of a larva could not be altogether governed by the colour of its food.

Mr. B. A. Bower exhibited a specimen of *Parasia neuropterella*, bred from heads of *Centaurea scabiosa*, and said he believed the species had not been previously bred. He also exhibited series of *Coleophora olivaceella*, *C. solitariella*, and *Laverna subbistrigella*. The President remarked on the beautiful condition and setting of the specimens.

Mr. White exhibited a series of male and female specimens of *Orgyia thyalina*, belonging to Mr. Leech, and obtained by the late Mr. J. H. Pryer, in Japan. Some of the females had their wings fully developed, and some of them were semi-apterous, as is usual with the females of this genus. Mr. White remarked that he knew of no other species of the genus in which the females had fully developed wings. Lord Walsingham, Prof. Meldola, and Mr. R. South took part in the discussion which ensued.

Lord Walsingham exhibited specimens of preserved larvæ of *Eupithecia extensaria*, from King's Lynn, Norfolk; also a preserved larva of *Smerinthus ocellatus* and one of *Sphinx ligustri*. The larva of the last named species was a variety, and the President remarked that it was the only one of this species he had ever seen.

The Secretary read a communication from the Rev. Dr. Walker announcing his intention of making an expedition to Iceland this year, from the 23rd June to the 29th July, and asking that any entomologists who might wish to accompany him would send him their names.

Mr. Gervase F. Mathew communicated a paper entitled "Descriptions and Life-Histories of new species of Rhopalocera from the Western Pacific."—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 21st, 1889.—Mr. J. A. CLARK in the chair. Mr. F. Milton was elected a member of the Society. Mr. Lusby exhibited a series of *V. urticae*, which included several dark varieties, and a fine bred series of *V. cardui*. Mr. Hanes, a series of *A. rufina*. Mr. J. A. Clark, a series of *C. flavicornis* from Forres, the specimens being all very large and strongly marked; a fair-sized specimen taken in Sussex was compared with them, and looked very dull and small by the side of the northern forms. Mr. Battley mentioned that he had seen a pair of seagulls at Stamford Hill, near London; they were flying at a great height, and he thought it rather unusual for this bird to come so near to the metropolis. Two specimens of *N. Hispidaria* were recorded from Richmond Park on February 17th. Messrs. Cripps and Lewcock exhibited boxes of Coleoptera, which included *Achenium humile* (from Esher), *Bolitobius analis*, *Lathrobium boreale*, and *B. multipunctum*, from Rainham (Essex).

March 7th, 1889.—Mr. HUCKETT, Vice-President in the chair. Mr. Bellamy

exhibited a fine series of *L. comma*, taken at sugar last year, in the North of London; he stated that the insect was very common last June in this locality, but was of opinion that this species was seldom abundant. Other members spoke on the subject and agreed with him in this respect, remarking, that although a common species, it was not usually taken in any great numbers. Mr. Hanes, a series of *X. ferruginea*, and varieties of *H. aurantiaria*. Mr. Clark, a very fine and variable series of *T. orbona*, from Forres; the variation was very extraordinary, the upper wings of some of the specimens being clear clay coloured, others rich viscous red, mottled with a darker tint; one specimen was almost black, having the under-wings strongly suffused with that colour. Mr. Clark also read a paper minutely describing the numerous varieties comprised in his exhibits; he stated that all the specimens were bred from ova received from Forres, the larvæ were fed up indoors during the winter months, the insects emerging in December last. He pointed out the great variation in the markings and colour of specimens of *T. orbona* from Forres, which was rendered the more extraordinary from the fact that examples of *T. fimbria* and *T. interjecta* from the same locality presented no such differences when contrasted with the southern types of these latter insects. Mr. Clark announced that he had received a pair of the Common Crossbill (*Loxia curvirostra*), from Brandon, where this bird was apparently very common. Mr. F. Wilton's exhibit comprised several species of aquatic Coleoptera, series of *Leistotrophus nebulosus*, *Staphylinus caesarius*, and other Staphylinidæ. Mr. Lewcock called attention to a series of *Bruchus*, resembling *Luteicornis*, exhibited by himself, with other coleoptera, but, having the antennæ and second pair of legs black instead of yellow. The exhibit has been sent to the Rev. Canon Fowler for his opinion in the matter.—EDMUND HANES and G. A. LEWCOCK, Joint Hon. Secretaries.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 28th, 1889.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Miss K. Hinchliff, of N. Devon; Messrs. J. F. Perry, of Birmingham; A. Nott, of Brixton; H. Moore, of Rotherhithe; G. J. Randall, of Brixton; W. H. Mc'Lachlan, of Clapham; and J. Smith, of Plumstead, were elected members. Mr. R. Adkin exhibited *Anerastia lotella*, from Forres, Norfolk, and Kent, *Dioryctria abietella*, from Forres and Kent, *Crambus dumetellus*, from Forres, with *C. pratellus*, and *C. dumetellus*, from Kent, and *C. ericellus*, for comparison, and called attention to the close resemblance of the Forres *dumetellus*, to the Kentish *pratellus*, in colour and size, but that the markings were clearly those of *dumetellus*. In answer to Mr. Tugwell, Mr. Adkin stated that the specimen of *D. abietella*, from Kent, was taken within a few miles of Deal, among a clump of about twenty fir trees. Mr. Tutt asked whether this species was ever taken away from firs, as Mr. Coverdale had a specimen in his collection which was captured at Shoeburyness, another one had been taken at Portland about three years ago, and was recorded in the *Entomological Monthly Magazine*. Mr. Tugwell, with regard to the last named, said it was not a very great distance from a

large and extensive fir district. Mr. Adkin said that firs were largely used in ornamental gardens, and it was therefore difficult to prove that there were no firs in any one locality, and with regard to the specimen taken at Shoebury, it might have emerged on a vessel laden with firs and then have flown on to the saltings. Mr. Cooper remarked that he had noticed a number of firs in the gardens adjoining the saltings at Shoebury. Mr. Robinson exhibited varieties of *Agrotis segetum* and *A. exclamations*, from Hunts. Mr. Manger, Coleoptera from Dargeeling, India, and Mr. Billups over forty species of *Arachnida*, including three rare and local species, *Heliophonus flavipes*, *Ballus depressus*, *Pachygnatha degeer*. Mr. Tugwell made some remarks on a communication he had received from Mr. Pierce, of Liverpool, as to determining species of *Zygenidæ* by an examination of the genital organs.

March 14th, 1889.—J. T. CARRINGTON, Esq., F.L.S., Vice-President in the chair. Mr. A. Horne, of Aberdeen, was elected a member. Mr. Percy Russ exhibited a large number of species of lepidoptera taken in the neighbourhood of Sligo, including *Aporophyla lutulenta*, var. *lunenburgensis*, and many other local forms and varieties. Mr. Adye, series of *Dasyampa rubiginea* and *Xanthia flavago*, taken in Hampshire. Mr. R. South, a curiously coloured specimen of *Zygena filipendulæ*, and what he thought was a variety of *Hadena dentina*, both received from Mr. Baxter, of St. Annson-Sea. Mr. R. Adkin, two dwarfed specimens of *Lycæna corydon*, an underside of the male of *L. icarus*, with the black central dot of the lower of the two basal spots on the superior wing absent and the outer light ring elongated, also specimens of *Endotricha flammealis*, *Scopula ferrugalis*, and *Rhodophæa marmorea*, all from the Sussex coast, 1888. The Secretary read a note from Mr. T. D. A. Cockerell, on *Pyraclomena corealis*, and an aberration of *Dermestes fasciatus*, having the left elytron grey below the grey band, almost as grey as the band itself, with little black marbling, the right elytron below the band, black with a trace of pale marbling, probably this was due to partial atavism. Mr. Tugwell read a paper "Practical Hints on breeding Macro-lepidoptera."—H. W. BARKER, Hon. Secretary.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

March 25th, 1889.—Mr. S. J. Capper, F.L.S., President, in the chair. Mr. A. T. Wootton was proposed for membership. The Hon. Secretary read "Notes on Coleoptera taken during 1888," dealing more particularly with pond work done by him in the Liverpool District. Messrs. C. H. H. Walker and F. N. Pierce (Vice-President) exhibited through the Micro-Lantern, and made remarks upon, some beautifully prepared microscopical slides showing the heads of various insects. Mr. A. T. Wootton exhibited a beautiful bred variety of *Vanessa atalanta*, the scarlet bands on all four wings being replaced by yellow. Mr. Pierce exhibited varieties of *B. perla* and *N. xanthographa*, the latter from Scotland. Mr. Moore exhibited four drawers of European *Lycenidæ*.—R. WILDING, Hon. Secretary.

Our Pterophori.

By RICHARD SOUTH, F.E.S.

A note on "Our Pterophori," by Mr. C. A. Briggs, in the March number of the *Young Naturalist* has just been introduced to my notice.

Confusion there is without doubt, both here and on the Continent, in connection with the Pterophori, but facetious criticism of honest attempts at the elucidation of some of the difficulties attending the study of species pertaining to this very perplexing group does not render such confusion any less confounded.

In his remarks, on the various species he has thought well to refer to, the writer is not always accurate when dealing with questions of fact, this is most unfortunate, as it implies either that he is insincere or ignorant of recent literature upon the subject.

The capture of *Lætus*, in N. Devon, has been recorded, *Entom.* XV. p. 35, but, perhaps the authenticity of this occurrence does not commend to one, who says, with assumed authority, when adverting to this insect, "no authentic record of captures in England exist"; so it may be well to produce other evidence.

Mr. Barrett (*E.M.M.* XVIII. p. 178), in discussing the identity of *Lætus*, Zell., and *Distans*, Zell., says, after examining types of each insect received from Prof. Zeller, that there can be very little doubt that *Lætus* is a variety of *Distans*; he then goes on to add, "a very few specimens have been taken at Folkestone, by Mr. Purdey and others of an *Oxyptilus*, which agrees absolutely with Continental *Lætus*," he concludes his remarks with this important observation, "I think I am at liberty to say that Prof. Zeller is also now of opinion that *Distans* and *Lætus* form but one species."

The statement that "*Bipunctidactylus* and *Plagiodactylus* have been clearly proved to be different in their larvæ and in their food, as well as in appearance," requires verification.

There are several other statements which are not reconcilable with fact, such, for instance, as *Farfarella* being in danger of being called identical with *Tæniadactylus*, but these may be ignored, as perhaps after all they are inconsequent, seeing that the communication in its entirety is probably intended rather as a literary effort in the direction of a style known as "smart writing," than a contribution of practical utility to students of British Pterophoridae.

At the same time it must be admitted that there is one profitable grain among the overflowing measure of useless chaff, and that is the correction of an error in the matter of *Heterodactylus*. The original

nomenclator was De Villers, as will be found on referring to Stephens *Syst. Cat. Brit. Ins.* II. p. 231., No. 7628; or to Stephens *Brit. Entom. Haust.* IV. (1834). It is not, however, very clear how this substitution of one authors name for another can affect the conclusion arrived at by Dr. Mason concerning the identity of *Heterodactylus* (c.f. *E.M.M.* XXV. p. 162). Unless it be proved that Haworth's *Heterodactylus* is not identical with the insect so named by De Villers, we may be wrong in saying that the "plume moth," we have known since 1870 as *Teucrui* was not known in 1789, as well as in 1829 as *Heterodactylus*.

12, Abbey Gardens, St. John's Wood, London, N.W.

By J. W. TUTT, F.E.S.

Although I cannot refer Mr. Briggs to any published record of *Distans* at Folkestone, Mr. Sydney Webb has recently sent round a considerable number of specimens of *O. distans* taken at Dover, for distribution among the members of the "Young Naturalist Exchange Club." I have taken several at Deal (on the sand hills) during the month of July in 1883 and 1888. There is no doubt that the Deal, Dover, Brandon, and Tuddenham specimens all belong to the same species, and the lepidopterist who can make two species out of these must be very shrewd.

So far as I can see *Lætus* and *Hieracii* should be knocked out of our lists at once, or rather they should never have been introduced. I trust Mr. Briggs will be able to obtain Mickleham *Pilosellæ*, and work out some reliable information regarding it. The so-called specimens of *Pilosellæ* that I have seen here have all been referable to *Distans*, *Teucrui*, or *Parvidactylus*, generally the former, but I have not seen Mickleham specimens.

Westcombe Park, London, S.E.

Notes on some Micro-Lepidoptera bred during 1888.

By GEO. ELISHA.

The uncertainty of the weather during the summer months of last season made collecting with the net a comparative failure, indeed, I found it risky business to go anywhere approaching a long journey, as wet generally came on before I reached my destination and many times kept steadily on, so that I was compelled to return without

doing anything, and, although it has sometimes ceased raining, the saturated condition of everything rendered the net quite useless, the result was larvæ collecting only could be done, and, that only by searching, in which occupation I was generally so far successful as to be quite satisfied with my few hours work, and which coupled with what I had been doing during the winter months, caused an unusually large number of insects to emerge in my cages.

The following are a few of the best I have bred among a host of commoner species, and, although at the risk of again mentioning some that have been noticed before, there may be a few to whom the following notes may be interesting and probably useful.

P. capreana. A nice series emerged from larvæ collected in May, the larvæ are of a bright green colour and fed in the shoots of *Salix caprea*, drawing the leaves together with a slight web, they are by no means common, although found in most southern woods.

P. derasana. This species, strange to say, emerged rather freely in my cages this year, although, hitherto I have found them rather difficult to breed. The larvæ are easily detected on the Buckthorn in September, by the leaves being folded over and fastened together the whole extent of the leaf, they remain in the larva state till the following spring, then crawl about for a day or two and pupate in hollow stems or rough cork; I have never observed them eating in spring, although, I have repeatedly put in fresh young leaves as soon as it was possible. The larvæ are to be found in most of the woods and lanes of Kent and Surrey.

P. immundana. A few bred from larvæ in rolled leaves of alder.

E. trigeminana. A long series emerged from roots of ragwort dug during the winter about Thames Haven.

S. rufillana. Emerged freely from larvæ feeding in the seed heads of *Daucus carota*, collected the previous autumn on Canvey Island.

D. alpinana and *saturnana*. A few bred from roots of tansy, dug at Deal, in January. The old spot, near where I got these roots, is, I am sorry to say, now under cultivation.

S. leplastriana. Many emerged from stems of wild cabbage, collected at Dover in April, they are detected by the little heaps of brownish frass sticking out of the new shoots and leaf stalks.

E. atricapitana. Emerged very freely from roots of ragwort dug at Thames Haven during the winter.

E. ciliana. A nice series in June, from larvæ feeding in seeds of cowslips collected the previous August at Box Hill; they require

- hollow stems or virgin cork to pupate in, and must be kept out of doors during winter.
- A. zephyrana*. A long series emerged from larvæ feeding in roots of *Daucus carota*, collected in January, on the coast between Herne Bay and Whitstable.
- R. turionana*. Bred freely from shoots of firs, from Mereworth Woods, Kent. I found the birds had cleared many shoots out.
- C. pomonana*. A few bred in June, from the fruit of *Sorbus aria*, collected at Sanderstead the previous autumn. Larva, obese, yellowish pink, posteriorly of a darker shade, head black, dark dorsal line, with two rows of dots each side, the larva feeds inside the fruit, throwing out brownish frass, spinning up in hollow stems or rough bark, and changing to the pupa in spring.
- A. æneana*. Bred a long series from larvæ feeding in roots of ragwort, collected during the winter, from Thames Haven.
- C. francillana*. Emerged freely in June, from larvæ in stems of *Daucus carota*, they are detected by the small holes in the stems. Collected in December, in the Warren, at Folkestone.
- P. verhuellella*. Bred a long series from larvæ feeding in the indusia of the common harts-tongue fern, collected in the lanes near Alkham, near Dover, in March.
- I. capitella*. Bred freely from currant shoots in April, the larvæ are easily detected by the drooping of the leaves of the shoots containing them.
- L. rubiella*. A few bred from shoots of raspberry having a similar appearance.
- N. schiffermillerella*. About three dozen larvæ in their fiddle shaped cases were collected in May, on *Ballota nigra* near Gravesend, from which a lovely series emerged.
- Y. plumbellus*. A long series emerged, the young larvæ are detected by the drooping of the shoots of the spindle, they afterwards feed externally on the leaves, drawing them together by a slight web, rather common at Box Hill.
- H. radiatella*. Bred a long and most variable series from larvæ beaten from oak in June, at Wimbledon. The larvæ are rather slender, tapering each end, of a dirty greenish colour with dark dorsal line and very lively like the rest of the genus.
- T. alpella*. A few bred from slender green larvæ, found crawling up oak trunks, end of May, at Wanstead.
- T. horridella*. Emerged freely in August from larvæ collected at Loughton, end of June, they are of a bright green colour with

white dorsal line, rather slender, tapering each end, and excessively lively, jumping about in all directions.

- H. nemorella*. A few bred from honeysuckle; the larvæ are brown, velvety looking, with white dorsal line, shaded off to the ground colour, two oblique stripes on each side, sloping towards anal end and several oblique lines, head light brown, very rough and striped with black, legs yellowish white, pro-legs black. Taken at Chingford.
- E. allisella*. A few bred from roots of *Artemisia vulgaris*; these larvæ in the spring, work up the new shoots causing them to droop and die, the roots were collected in the lanes about Bansted Downs, in February.
- D. cnicella*. Many bred from larvæ feeding in the shoots of sea-holly, in the spring at Shoeburyness.
- G. vilella*. A long series emerged in August, from larvæ feeding on the seeds of mallow, at Southend.
- G. scriptella*. Many emerged from larvæ in folded leaves of maple collected in August, at Plumstead.
- G. mouffetella*. Bred a nice lot from larvæ in shoots of honeysuckle, collected at Woodford, in May.
- G. hermannella*. Bred from larvæ mining leaves of *Chenopodium* in the previous autumn, Hackney Marshes.
- A. fusco-aurella*. A long series emerged in August from larvæ found in April under decaying bark of elm; the larvæ are of a dirty brownish colour, inclining to black, with indistinct dorsal line, spiracles blackish, emitting short hairs; head shining yellowish brown; legs yellowish brown, prolegs black; found in lanes near Walthamstow.
- D. ocnerostomella*. Emerged in profusion from old stems of *Vipers bugloss* found at Cuxton, near Stroud, Kent.
- A. conjugella*. Emerged freely from berries of mountain ash, collected the previous autumn; none of the dark variety emerged.
- Z. hepariella*. A nice lot bred from larvæ feeding in shoots of oak, in June; collected at Box Hill.
- G. tringipennella*. Bred from larvæ, feeding in leaves of plantain on the upper side giving them a blistered appearance.
- G. elongella*. A long series bred from larvæ in rolled leaves of alder; from Brentwood.
- G. auroguttella*. Many emerged from larvæ feeding in cones on *Hypericum perforatum*, at Box Hill, in June.
- G. semifasciella*. A few bred from larvæ in rolled leaves of maple, at

Box Hill, in July; the majority of those collected were infested with ichneumons.

- C. limoniella* (*G. atriplicivorella*). Bred a great number from stems of sea lavender, collected during the previous winter on the Essex Salt Marshes. These larvæ feed on the flowers, eating out one of the petals and using it as a case, in which it moves about till full-fed in December, then crawling down the stem, eating its way inside, covering up the small holes with a slight web, soon after which the cases drop off.
- C. ibipennella* and *palliatella*. A long series of each from cases on birch in May, at Wimbledon.
- C. ardæpennella*. A few bred from cases on oak in May.
- C. therinella*. Emerged rather freely from cases on thistles, found on Hackey Marshes the previous October.
- C. murinipennella*. A few bred from cases found on *Luzula pilosa*.
- C. hemerobiella*. A very few cases found on whitethorn in May. This and the following seem to be getting very scarce; these were collected near Snaresbrook.
- C. badiipennella*. A few bred from cases on elm. The hedges in the lanes close to Leyton station, where this species used to occur, are all cut down and the place is entirely built over.
- C. wilkinsonella*. A nice lot bred from cases on birch, collected at Snaresbrook, Epping Forest.
- B. somnulentella*. A few bred from larvæ feeding in the leaves of *convolvulus sepium*. Three years ago this larva occurred in abundance in a lane, at Northfleet, since which, I have never found in any season a dozen leaves with larvæ in them, but it is a fact often noticed with this species, of it occurring abundantly one year, and as suddenly disappearing for many years after.
- C. druriella*. A few bred from a great number of larvæ collected mining the leaves of wild hop; there is no keeping these wretched little restless larvæ in the cages, they squeeze themselves through the finest gauze, which is the reason so few are bred.
- L. miscella*. A few long series bred from larvæ mining leaves of *Helianthemum vulgare*. Collected at Sanderstead in June.
- L. raschkiella* and *conturbatella*. Bred from larvæ collected at Box Hill, the former mining the leaves in July and the latter feeding in the shoots, drawing them together with a slight web.
- A. trietskiella*. A long series from larvæ mining leaves of dogwood in October, afterwards cutting out oval cases in which they remain till the following year; found in lanes about Bexley.

- P. suffusella*. Emerged in profusion from larvæ mining leaves of Poplar in August; the mine has the singular appearance of a snail having crawled over the leaf—Loughton.
- C. lathyrifoliella*. A nice series bred from larvæ found mining leaves of *Lathyrus sylvestris* in August, at Sandown Bay, Isle of Wight.
- Buc. cidarella*. A few bred in June from larvæ found in September on leaves of alder; they spun thin ribbed cocoons on the stems.
- A. bennetii*. Bred in July from larvæ found eating the leaves of sea lavender in May, the large pieces eaten out were a good guide as to their whereabouts. Almost anywhere on the salt marshes about Thames Haven.

Also a few good species of *Pterophorus* and a great number of species of *Lithocolletis* and a few *Nepticulæ*, bred by forcing in the early part of the season and with a few other species I find I have omitted, have kept me pretty busy setting, notwithstanding the almost continuous wet that has prevailed when the best collecting was to be done.

Review.

“The Naturalist in Siluria, by Capt. Mayne Reid.”*

Captain Mayne Reid is well known for his interesting stories of adventure, so deservedly popular among boys, and the present work will not lessen his popularity among that section who have any taste for Natural History. The title of the work has a foreign sound about it, and leads one to wonder whereabouts in the world Siluria may be. The scene of it, however, is in Herefordshire, near the city of Hereford, where “Silurian strata exposed by upheaval” form the surface of the land. The book is a pleasant gossiping account of the “birds and beasts” to be observed in that neighbourhood, and includes interesting notes on many of our rarer species. The observations on the mole are of especial interest, as that subterranean animal has been the subject of so many strange romances. Most of these Capt. Reid explodes, devoting considerable time to the demolition of that fabulous structure, the “mole’s castle.” The author does not believe in the mole as a benefactor to farmers. He asserts it will not eat wireworms, and, whatever good it may do in bringing up soil from below to the surface, is better done, in his opinion, by the earth worm which forms the mole’s favourite food. We cordially commend the book to our young readers, though we doubt Capt. Reid will not succeed in proving that we have two species of the magpie in this country.

* SWAN, SONNENSCHIEEN & Co., 1889.

Notes and Observations.

THE GREAT NORTHERN DIVER AT HARTLEPOOL.—A boy brought me a very fine example of this rare bird to-day, which had been captured by a fishing boat a mile or two out. It is immature, the white spots just showing, and the dark bars visible as a darker shade only. I found it had been wounded, a No. 5. shot dropped out of its head when I removed the skin. This probably accounted for it allowing itself to be taken by the hand.—JAMES A. MANN, Empress Hotel, Hartlepool, 26th February, 1889.

On the Wings of Insects.*

By CHARLES H. H. WALKER.

The microscopical character and general functions of these most important appendages, so eminently characteristic of, but not alone peculiar to the class Insecta, comprise a subject of exceeding magnitude, and possessed of an unusual amount of interest and scope for the student of entomological science. It is upon these members that Nature has been most lavish in her chaste and brilliant adornment, spreading them with rich pigments of every hue, and studding them with flashing jewels snatched from undying flames; and, inasmuch as she has endowed some with such richness of colour, so also has the fickle goddess withheld from others the wealth of subtle harmony and forcible contrast with which their brethren are furnished: giving unto them dark and sombre shadows, and pluming their pinions with feathers black as the raven's wing. Yet are one and all modelled with the same exquisite skill, and, in no case, unqualified to meet the many requirements of their tiny owners. The blending of colours and tints is never obtrusive; every sweeping curve and sheeny pigment is in itself a study, but a reflection and lasting tribute to the Master Mind that evolved them.

Within the compass of the present paper, I must necessarily be little more than superficial, and I would rather desire it to serve as an introduction to a branch of entomology that will amply repay the observer for an unlimited expenditure of time and labour. Personally, I have found the subject replete with interest, though I have perforce omitted much that has seemed to me deserving of minute investigation, chiefly from the extreme paucity of working material to which I have had access. Therefore have I borrowed freely on every hand, finding

* The original illustrations to this article are drawn and engraved by the author.

much that partook of the character problematical, and which but formed the base for some curious experiments and careful dissections.

The wings of insects are chiefly intended to serve one purpose in particular, viz.—to assist the creature in migrating from one spot to another in search of food, and to assist in the propagation of its kind. They are utilised for various other minor purposes, such as the creation of sound, a cloak for concealment, and also as an effective shield to ward off the attacks of numerous enemies. To each of these, however, I will again refer in the proper places.

They serve as great aids to the naturalist in distinguishing the various orders, and also in discriminating between species: for such is their infinite variation, that they form an efficient and almost complete key to nomenclature, and all the existing, or I should say, known orders, take their denomination from some prevailing character of wing formation. Westwood classes the insect world into thirteen great divisions or orders, but as we cannot at present deal with those additional features that justify his arrangement, I will take them in such sequence as may be alone indicated by the nature and numbers of the organs of flight.

The general structure of the wings is very similar throughout all the orders. They consist of two membranes united at their edges, and traversed by a series of horny rays, which run between them, the upper of which is more strongly attached to them than the lower. These wing-rays or *nervures*, as we are accustomed to call them, are hollow tubes, convex on the upper surface, flat and of a slighter texture on their underside.

Entomologists vary very much in their ideas as to the use of the nervures, many being of the opinion that they are vessels for the conveyance of fluid, others that they are merely air passages. I have devoted some considerable time to a probable solution of the question, and it may perhaps be interesting to place the results before the reader. Both theories are right, but I found certain conditions were necessary to be observed in successfully conducting the necessary experiments, in order to arrive at any definite conclusion. In the first place, the nervures, during the life of the insect are filled with a transparent gelatinous substance, which, as I shall show later on, is the outcome of one of the earliest acts of the creature to provide itself with the special organs forming the subject of my paper. Messrs. Kirby and Spence, in their admirable work, tell us that the nervures contain a spiral thread, and this is readily reconcilable with the assertion of more modern writers, that they are really traversed by

tracheæ, which are membranous tubes, containing an elastic spiral wound round and round. From the minutely microscopical character of these air tubes or tracheæ, it is only rational to anticipate some considerable difficulty in tracing them, more especially in specimens prepared in the usual manner for the microscope. I have found that for the convenience of figuring these tracheæ in their most intricate ramifications, the upper wings of certain species of Orthoptera are most suitable for the purpose, and Fig. 1 gives a highly magnified



Fig. 1.

representation of a portion of the tegminis or anterior wing of *Locusta migratoria*. From this it will be at once seen that a very perfect and highly complex system of tracheæ traverse the wings, the principal branches being contained in the nervures, the larger wings-rays often possessing two main trunks running parallel to each other, which again send one or more branches of lesser importance through the nervules or inferior rays.

Now if a specimen be taken from the upper wing of a locust, carefully dried, and then immersed for a second in oil of cloves, and quickly placed beneath a good $\frac{1}{4}$ -inch objective, these tracheæ will be found for the greater part to be filled with air, and while the rest of the wing is permeated and rendered perfectly transparent by the action of the oil, the air tubes stand out as finely pencilled black lines. On treating a specimen in this manner, it will be found that the external walls of the nervures are pierced in innumerable places by filamentous and branched tracheæ, spreading all over the adjacent membrane, and which, under ordinary circumstances, are totally invisible. It is obvious that these secondary tracheæ pass between the two membranes comprising the wing, and are possibly attached to one, or more likely to both, and I am further inclined to think that the terminations of these tubes do not open into the external atmosphere, but have their extremities closed. I will not consider at present the probable duties performed by the wing tracheæ, as I shall have occasion to again refer to them.

Another most important consideration, and that will be found to have considerable bearing upon the subject, is the minute structure

of the nervures. This is shown at *B* in the same diagram, and is best seen when a bubble of air is enclosed between the walls of the tube, in a specimen treated as before mentioned. They consist of rings, many of which are incomplete, of horny integument, alternated with similar bands of a thinner substance. These form tubular walls of varying thicknesses, not so much proportioned to the size of the insect as to the greater or less use made by it of the wings with which it is furnished. It is stated that the circulation of the blood may be seen in the wing nervures of some bees, butterflies, and neuroptera, while in the pupal state, but I have not yet had an opportunity of indulging my curiosity in this respect.

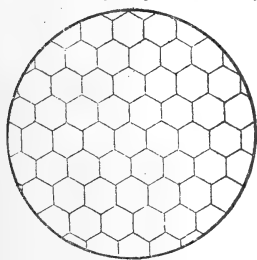


Fig. 2.

Though the wing membrane is double, with adhesion along the margin and the nervures, it must not be surmised that these are the only points of absolute contact. With careful microscopical adjustment the surface of the membrane is seen to be divided into minute polygonal areolæ, to which appearance, and from the six-sided nature of these cells, the term *hexagonal areolation* has been appropriately given. Fig. 2 represents a very small portion of the upper wing of *Acheta domestica* (the House Cricket), but it must not be imagined for one moment that the appearance is anything like so strongly marked in the natural membrane, and it is only with lenses of clear definition that it can be seen at all. The resemblance to the faceted eyes of most hexapods is very strong. It is most probably caused by the adherence of the two membranes along the lines of demarcation.

The primary use of the nervures is undoubtedly to strengthen the wings and prevent them from tearing, for we observe that insects habitually accustomed to remain on the wing for a considerable length of time, possess strong nervures, combined with an extensive supply, their membranes being divided into a large number of cells by them.

This division of the wing into enclosed spaces, or cells, as they are more correctly termed, by the nervures, is of considerable assistance in the determination of species, especially among insects resembling one another in their characteristics. The nervures also serve another important purpose, being the means of attachment to the body of the insect. Their bases are thickened or expanded, the movements of the wings being anchored to them at this point.

Some species are remarkable for the almost entire absence of nervures; more especially is this found to be the case among many

small Hymenopterous insects, though I am not aware that their powers of flight are at all impaired thereby.

The number of wings varies in different orders, there never being more than four (with one exception, referred to later on) or less than two, when present at all; but numbers of insects never acquire these organs, their peculiar habits of life giving them no use for such appendages.

The development of the wings is a curious and interesting feature. In some species they are present in both larval and pupal stages, but are rudimentary and totally unfit for flight. Among insects passing through complete metamorphoses the rudiments of the wings are formed immediately after the larva has thrown off its last skin, sometimes appearing as lumps on those segments corresponding to the thorax of the imago, and in the pupal stage, are plainly visible through the external swathing of the insect.

Presently the day comes when the last great change is about to take place, when the insect bursts from its living tomb, to unfold its wet and shrivelled wings to the view, and enter upon the final phases of its chequered career. Truly it presents but a sorry forecast of the splendid robes with which it will shortly become decked; the membranes are covered with folds and creases, the nervures are also contracted to their utmost, and the whole structure of the wing is soft, moist and pliable. It is at this period of the creature's existence that the nervures are called upon to fulfil a most important function, which their peculiar formation fully qualifies them to perform. They are straightened out laterally by the combined effects of two causes, air and fluid. The enclosed tracheæ serve for the passage of the former, while the latter is pumped through the unoccupied space between the boundary walls and the tracheæ. The ready extension of the nervures will be sufficiently plain from the consideration of their structure, which admits of expansion much in the same manner as a concertina filled with air. As the nervures, together with the lesser branches, increase in length, so the membrane stretches in all directions, the process drawing it out perfectly flat and smooth, and removing all creases and convolutions from its surface.

That the nervures are injected by fluid for the purpose of developing the wings, the discovery before referred to, of the circulation of the blood through these tubes, goes far to prove, but that this liquid undergoes a change when brought into more intimate communication with the air is evident. When it has accomplished its purpose, coagulation sets in, and it becomes a colourless, and jelly-like substance,

If a wing be cut across during the life of the insect, the nervures do not bleed: but apply considerable pressure between two plates of glass, and a viscid, homogeneous mass exudes.

The expansion of the wings is materially assisted by the insect resting in a perpendicular position, usually on a wall, fence, or tree trunk, the head being uppermost, and the weight of the wings acting downwards.

The development generally takes place at night or early morning, though much depends upon the hour of the day devoted by the insect to the use of its wings. Some spot sheltered from the direct rays of the sun is usually selected, to avoid any risk of the membranes becoming dry and hard before being completely expanded, and so crippling the creature for life. Even under the most favourable auspices, there may be failure in development arising from weakness, and consequent inability to force the vivifying fluid through the hollow nervures. Sometimes a wing is absent, nor can the slightest trace of it be discovered: this is a true monstrosity, and should be preserved as such. Or, again, one or more wings, having received some injury, possibly owing to the nervures being choked, or a crease or fold beyond the power of the insect to straighten, occurring at the roots, the result is known as a cripple.

We may now consider the positions and number of the wings, adding a few remarks upon the terms used in distinguishing one part of the wing from another. Those members, whether two or four in number, are attached to the thorax, or second great division of an insect's body. The thorax is again divided into three chief parts: the *pro-thorax*, *meso-thorax*, and *meta-thorax*.

The *pro-thorax* is never provided with wings, and is usually small, being cramped and contracted to make room for the powerful motive muscles contained in the two other segments; and in all insects having four organs of flight, the anterior pair are affixed to the meso-thorax, and the posterior couple to the meta-thorax—in both cases, one on each side. In some orders, such as the lepidoptera and hymenoptera, the roots of the anterior wings are protected by a pair of scales termed *tegulae*, but I will merely mention them, as they are not attachments to the wings, and consequently need no further reference.

In the typical wing, the root or place of attachment to the thorax is termed the *base*; the upper or outside edge, the *costal* or *anterior margin*; that portion nearest to the abdomen when the wings are laid at rest, is called the *interior* or *inner margin*; and that part of the wing

overlying or adjacent to the organs of reproduction, the *posterior* or *hind margin*. The angle included between the interior and posterior margins is appropriately called the *anal angle*. The positions of the nervures in every case give them the names they bear. Thus, the stout thick nervure immediately beneath or upon the anterior margin is the *costal nervure*, and the one under that again and often nearly parallel to it, the *sub-costal nervure*: the two enclose a *costal cell*. The middle ray of the wing, running from the base towards a central point in the hind margin, is the *median nervure*, but is recurved, and meets the sub-costal ray at a spot about half its length, and thus isolates a large, triangular space, known as the *discoidal cell*. This cell encloses the *orbicular spot*, so familiar to lepidopterist; while the *reniform* rests upon what may be considered as the continuation of the median nervure just before it joins the sub-costal. The last of the principal branches, the *sub-median nervure*, runs from the base to the anal angle, and encloses, with the interior margin, the *anal cell*. The median and sub-median nervures are often bridged together by a short ray meeting each at a point one-third of its length from the base, to this the name of *interno median nervure* has been given.

There only remains to mention the inferior rays passing from the median nervure to the posterior margin. Those underlying the sub-costal nervure being termed *sub-costal nervules* and enclosing *sub-marginal cells*: the remainder chiefly *median* and *sub-median nervules*.

Most of the above are reproduced, and may be readily traced in the posterior wings.

The front, or anterior pair, are not always fitted for flight, being sometimes hard and horny, and used to protect the posterior or hinder pair: they are then termed *elytra*. Sometimes they are of large size and thickly reticulated, of the consistence of parchment, and not much resembling the wings they cover. The term *tegmina* in this case is appropriately applied.

In one curious order the fore-wings are absent, being represented by small twisted appendages, termed *pseudo halteres*. Again, we find all four wings present, but none of them fit for flight, and another and very extensive order possesses the anterior wings, the hindermost being transformed into *halteres*.

Some two-winged insects have the basal part of the anterior wing provided with small membranous appendages of a similar nature to the rest of the wing, and known by the name of *alulæ* or *winglets*. When the wings are of almost equal size, it will be observed that those segments bearing them, viz.: the *meso* and *meta-thoraces*, are of equal

importance, but when one pair are much larger than the other, or present to the exclusion of the second pair, then the ailiferous segment is the larger of the two.

Primarily, we may divide the Class Insecta into two large divisions, placing under the one head all those furnished with four wings, and under the other those possessing two wings only. The first section alone includes eleven out of the thirteen known orders, in which the character of the wings will be found to vary very greatly. Having, then, as a basis, the classification adopted by Professor Westwood, the Orders may be tabulated as follows, according to the character and importance of the organs of flight, and in this rotation they will be considered in the ensuing pages.

| | | ORDER. | DERIVATION. | TYPICAL EXAMPLES. |
|--|---|--------------|---------------------------------|-----------------------|
| I. With four membranous wings, all used for flight. | A | NEUROPTERA | <i>Neuron</i> , a nerve | Dragon Flies |
| | B | HYMENOPTERA | <i>Humen</i> , a membrane | Bees and Wasps |
| | C | HOMOPTERA | <i>Homios</i> , alike | Cicades, Aphides |
| | D | LEPIDOPTERA | <i>Lepis</i> , a scale | Butterflies and Moths |
| | E | TRICHOPTERA | <i>Thrix</i> , a hair | Caddice Flies |
| | F | THYSANOPTERA | <i>Thusanos</i> , a fringe | Thrips |
| II. With four wings all used for flight. Anterior pair greatly reticulated, the posterior membranous. | | ORTHOPTERA | <i>Orthos</i> , straight | Cockroaches |
| III. With two membranous posterior wings. The anterior tough and coriaceous at base, the apex membranous | | HETEROPTERA | <i>Heteros</i> , unlike | Bugs |
| IV. With two membranous wings. The anterior horny or leathery, and unfit for flight. | A | COLEOPTERA | <i>Koleos</i> , a sheath | Beetles |
| | B | EUPLEOPTERA | <i>Euplektos</i> , well twisted | Earwigs |
| V. With four nearly obsolete wings. | | APHANIPTERA | <i>Aphanes</i> , obscure | Fleas |
| VI. With two membranous anterior wings. | | DIPTERA | <i>Dis</i> , twice | Flies |
| VII. With two membranous posterior wings. | | STREPSIPTERA | <i>Streptos</i> , twisted | Stylops |

I will not discuss the reasons that have induced Sir John Lubbock and others to separate the *Thysanura* from the Insecta, for, being absolutely apterous, they would not come at all within the province of the present paper, whether insects or not.

The foregoing arrangement will show in some degree the extreme variation in wing character, and there are very few orders indeed that will not furnish some most extraordinary exceptions. We may take as an example the first one on our list, the Neuroptera, the prevailing characteristics of which meet with many curious aberrations. Their pupæ, which, for the greater part, are as nimble as their larvæ, and eat as much, show their rudimental wings in the shape of four leathery plates. The perfect wings are, as in the case of *Libellulidæ* or Dragon Flies, covered with a most intricate network of nerves, enclosing a large number of small cells. We should immediately infer, on seeing the insect, that it is endowed with great powers of flight, deriving such theory from the strength and size of the wings, a supposition ably borne out by observation, the flight of the insect being graceful and beautiful in the extreme. They seem proud of the powers with which they are so abundantly supplied, and fully employ them in the ruthless destruction of almost all other insects.

The large, common Dragon Fly, *Æshnia grandis*, is a familiar object to every vernal rambler, being particularly favourable to the roadside hedgerows in the vicinity of some green and slimy pit. It seems to have a regular beat, to which it will again and again return when driven away, and may be observed to frequently disturb the family harmony of a group of gnats, who have selected the projecting branch of some twisted oak, as a highly suitable centre for their restless aerial gyrations. One can almost hear the snap of his cruel jaws as he swoops through the giddy crowd of flies, bearing one off as a trophy, to be torn asunder and devoured. The creature seems to have a marvellous facility for flying in all directions without turning, and this is not one of the least curious phases in the habits of these strange insects. When assuming the position of rest, the wings are expanded to their utmost, never laid on its back, an accomplishment this species is quite unable to acquire, though most of its congeners, such as the Demoiselles or *Agrionidæ*, are quite capable of closing the wings together, in a position more consistent with the idea of repose. These insects have been found 300 miles out at sea, which speaks highly for their powers of endurance and flight. Their wings are sometimes of the most resplendent hues, metallic green and purple; at other times suffused with a warm brown, or crossed with deep rich bands of the

same colour. The meso and meta-thoraces are found to be found to be unusually well developed in the Dragon Flies, which characteristic alone is sufficient to indicate insects accustomed to make full use of their wings. The great length of the abdomen is likewise a familiar feature in these predacious creatures.

The *Ephemeridæ* comprise another highly interesting group of Neuropterous insects. They may be seen in large numbers in damp marshy grounds or gambolling over the surface of the water wherein they passed the greater part of their existence. The posterior wings in this group are dwindled down to very inconsiderable dimensions, considering the high development they obtain in allied families. Prof. Westwood mentions their entire absence in some species. These insects seem to undergo a double metamorphosis from the pupal to perfect state, throwing off, after a brief and laboured flight of a few feet, a second skin, which envelopes the whole of the body and wings.

In the *Perlidæ* or Stone Flies, the hind-wings are folded, and all four are greatly reticulated and covered with hair.

Some species of *Myrmelionidæ* have the hind-wings resembling a long slender shaft, expanded at the tip, but the general character of these members is apparent with a magnifier, but in *Asculaphus filipennis*, an Indian species, they become mere threads of great length.

The *Termites* or White Ants are natives of tropical climes, and are also abundant in the warmer countries of Europe. Both sexes are provided with wings, but the neuters are destitute of them. After pairing, the male and female throw them off at the roots by jerks, having then no further use for organs that would only prove an incumbrance.

The wings of *Hymenoptera* are not covered with such an intricate interlacement of nervules as those of the order just considered, but are confined to the possession of the principal branches to which I have already referred. Notwithstanding this, such is their infinite variation, that they have been adopted by entomologists as a ready means of discriminating between obscure species. A well-known feature of the wings of this order is a marginal spot, called the *stigma*, caused by a peculiar dilatation and apparent interruption of the costal nervure of the anterior wing. This occurs at a point about three-fifths of the distance from the base to the apex. The enclosed trachea is greatly thickened, but pursues its sinuous course without a break. The costal nervure does not always run to the extreme apex of the wing, but, as in most *Apidæ*, stops abruptly half-way between the stigma and anterior angle: it then describes a return curve to the

stigma again, thus enclosing a marginal cell. In other genera, this branch is continued to near the apex, there becoming obsolete, and sending off the return nerve to the stigma. This sudden stoppage of a nervure is a very common phenomena in all insects, but is often more apparent than real, and generally causes, when actually present, an incomplete closure of a cell, the abrupt termination or "blind lead" being most marked. Without the aid of a careful microscopical investigation, however, it is impossible to accurately determine whether a cell is really imperfectly closed, or only seemingly so, and it is necessary to clearly distinguish between the two. Both instances occur in the genus *Ophion*. The first sub-marginal cell in the anterior wing is thus incompletely isolated, and the second discoidal cell appears likewise incomplete until more minutely examined. By treating the entire appendage with oil of cloves in the manner before stated, it will then be found that the structure of the nervure undergoes a natural, but sudden transition, thin, highly transparent, colourless walls, being substituted for the thick, coloured membrane forming the remainder of the ray. And were it not for the fact that the trachea suffers no interruption, but as a black, convoluted thread, pursues the even tenor of its way, it would be a matter of considerable difficulty to prove the presence of the nervure at all.

Some Hymenopterous genera are remarkable for the almost entire absence of wing rays, but the location and course of the missing nervures is generally marked by a brownish discolouration and thickening of the membrane. Obsolete nervures may thus be traced in the anterior and posterior wings of bees, and those of the *Chalcididae* are more than commonly deficient in this respect.

But the chief and best known characteristic of the wings of Hymenoptera, is the arrangement for connecting, during flight, the anterior and posterior wings in one unbroken plane. The under pair are provided with a number of hooks, placed in a more or less irregular row, and having their bases immovably fixed to the costal nervure. These curious appendages vary considerably in position and number, some species possessing no more than two, while others are more abundantly furnished with twenty and upwards. They are likewise scattered all along the costa, and it is not unfrequent to find a double set, as in *Ophion*, one section being placed near the base, and the other about half distance from root to tip. They are very highly developed in the *Apidae*, reaching an advanced degree of perfection, both as regards solidity of structure and beautiful regularity of arrangement. I have, in Fig. 3, given a magnified representation of the hooks as

found in *Bombus terrestris*, twenty-three in number, and shaped like inverted letter Vs.

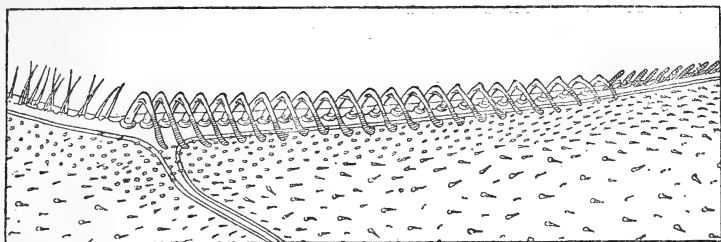


Fig. 3.

An examination of the interior margin of the upper wing will show that it is, immediately above the hooks on the under wing, turned over to form a ridge or channel, the membrane of that particular part being of a horny texture—extremely strong and tough. This tendency of the membrane to adapt itself to requirements is exceedingly interesting, but it does not so much alter its *quality* as its *quantity*, being thickened to a more or less degree as the exigencies of the case demand. This ridge, then, forms a most convenient receptacle for the hooks, which fall naturally into it at such times when the wings are extended for flight.

Advantage of this tendency is taken when setting Hymenoptera for the cabinet, the hooks drawing up the under wings into a natural position with the anterior pair, and thus enabling both sets to be expanded with facility. Too little attention is paid by collectors to natural setting, more regard for personal “fads” being indulged in than is in many cases justifiable. I have seen many beautiful insects rendered utterly worthless as natural studies by a weakness of this description. The wings set flat, curved, angular, brought forward to a position that would destroy the function of every muscle, hung back with a shamefaced slouch, parting company when they should be attached, squeezed together in instances where they ought to be divided, and in fine, some absurd notion indulged in to the exclusion of all others. Hence, in setting Hymenoptera, it is necessary to see that the wings are fairly hooked together before bracing down.

It is evident, or will become so on reflection, that the wing hooks are, in reality, merely modified bristles, as the transition from the one to the other is very marked in some species. In the example before us, the change from hook to bristle is abrupt, but in the case of the gall fly from the oak, *Spathegaster baccarum* (Fig. 4), the transfor-

mation is deliberate; of the three hooks, only two being fitted to perform the functions for which they exist, and, in all probability, but one properly so. *Aulax hieracii*, another gall fly (Fig. 5.), has three fairly well developed hooks, while *Synergus incrassatus* (Fig. 6.), a lodger

Fig. 7.

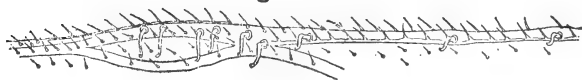


Fig. 5.



Fig. 4.



Fig. 6.

in galls, possess a similar number, but all perfect. In *Nematus gallicola*, a sawfly (Fig. 7), is an example of irregular hooks, they being nine in number, but scattered all along the costal nervures. In all instances, the free ends of the hooks are recurved, to prevent laceration of the folded membrane of the upper wing, provided for their reception.

(To be continued).

On the Periodic Abundance of certain Lepidoptera.

By W. E. SHARP.

I have been greatly interested in Mr. Corbett's article in the February number of this magazine on the causes which lead to the erratic appearance of certain lepidoptera. The subject has a kind of mystery which is very fascinating, and the difficulty of finding any theory which will satisfactorily account for such phenomena, endues it with a singular interest. As Mr. Corbett says, the two principal explanations so far advanced, are the retarded development, and the migratory or blown-over, theories. As regards the first I think, with Mr. Corbett, that it is untenable, if from no other reason than from the probability that the only form, *i.e.*, the pupa or ovum in which such retardation could be possible, would, long before the expiration of the decade which often elapses between two prolific seasons, have

been utterly exterminated by the many insect and other foes which constantly find it so helpless a prey. But what I wish more especially to consider is that theory of migration, either voluntary or involuntary, in which Mr. Corbett appears to find the secret of our *Galii* and *Edusa* years. I have been unable, I must admit, to entirely agree with him. Let us consider the theory in its bearing on our two most noteworthy cases, the two species already mentioned.

It is evident, then, that we shall require a migration from some place, presumably the Continent, either voluntary, and in obedience to an instinct akin to that which directs the swallow and the fieldfare, or else involuntary, and caused by the only possible agency, namely, the wind. But I do not think we have any warrant for assuming any such thing as insect migratory instinct, except perhaps in the case of locusts, and even here I fancy the principal impelling reason for their notorious flights, is either the fact that having exhausted the entire edible resources of one district, hunger drives them to move on to pastures new, or else the entirely involuntary agency of a strong and steady wind which drives them like clouds before its path. Instinct must have some sufficiently compelling motive to lead to its exercise: we can find none in the case of lepidoptera, it is obviously not the need of food, still less the advantage derivable by offspring, nor do we think we have any recorded observations sufficient to justify its assumption.

Mr. Corbett refers to the great swarms of *Cardui* and *Gamma* on the Continent. It was in the summer of 1879 that one of the most noticeable of these appeared, and I happened to be on the Continent that year, and observed them from Germany northwards into Sweden. I remember seeing the theory broached somewhere at the time that a vast army of these two species, bred somewhere in the south of Europe, had swept northwards across the Continent until presumably they died out among arctic snows in the late autumn. But to confirm this, the further north the insects travelled the more battered and worn should they have been. My observation did not bear this out, the specimens in Sweden were just as bright and fresh as those in Germany. My belief is that the emergences, although not coincident, were distinct, through all the countries in which they were seen.

But to return to *Galii* in England. Even if we can accept the instinctive migration theory at all, we have still to apply it to the requirements of the case. The only possible origin of the immigrants could have been the coasts of France, Belgium, or Holland, therefore

to explain the insect's appearance here in Cheshire, where the larvæ seem to have been in greater profusion than on the south coasts (where by this theory one would expect them to have been in much larger numbers), we must assume that impelled by some unerring instinct, in comparison with which that of the swallow or "the prudent crane" were mere foolish blundering, certain individuals who, we must remember, could by no possibility, from the very nature of the case, have had the slightest previous experience either inherited or acquired, made direct right across England for certain spots in Cheshire and elsewhere where their particular food-plant was in abundance. I think Mr. Corbett's quotation from Euclid would apply to such an assumption.

If on the contrary, we give up the theory of voluntary migration and fall back on wind-blown immigration, we are no better off, for then the enormous numbers of the host which must originally have left some other land in order that the few spots which by the presence of their food-plants could have intercepted and arrested them in such large numbers as we see, appears quite incredible and could not possibly have escaped observation. I think the same reasons slightly modified will apply to *Edusa*, although there is no doubt that the agency of southerly and easterly winds does account for certain isolated instances of rare insects found sporadically every season along the south coasts.

If then neither retardation of development nor immigration seems an adequate explanation of these strange phenomena, what other theory can be adduced. I think the whole subject is too little understood to dogmatize about it, and it strikes me that if we knew more of the various contingencies which influence and assail the embryonic life of all insects, we should see our way more clearly to an explanation. Entomologists know that almost every species of insect we have is subject to great fluctuation in appearance. We have *Antiopea* years, years when *Coccinella* do more especially abound, and seasons when every other insect seems to be an earwig; and it seems to me that the secret of all these variations lies in the mutual correlation of two factors: (1.) That all insects are individually so prolific that if the majority of ova in each year of any species came to perfection, each year would witness such abundance as now strikes us by its variety. (2.) That the destruction of immature insect life is so enormous that in normal years only the smallest fraction of original ova ever see the imago state.

Moreover the forces arrayed against this immature life are as

complex as they are variable. We have first the weather, then the effect of other animal life, then the influence of plant life, and these three so interact, are so mutually dependent and contingent, that we could never in our present state of knowledge define the real determining cause of any particular so called natural result.

My idea then is that there are emergences every year of such insects as we are considering in all the places where they are ever found, and that every year an infinitely greater number of ova are laid than ever reach maturity, but that by some conjunction of circumstances which we do not at present accurately know, the ova, larvæ, or pupæ, or all three were, say in the case of *Galii*, during 1887, peculiariy exempt from those adverse influences which unusually decimate them, that this led to a relatively large emergence this last summer and through some still further favourable influences to a very large number of mature larvæ. Next year such influences may have ceased to act or others arise which may neutralize them, and but few successors may escape to carry on the line till the next favourable season. And I fancy if we had any idea of the infinite number of contingencies which went to make up such favourable seasons, we should not feel surprised that they occur so seldom.

The subject could be greatly elaborated in a larger paper, but I have only wished to suggest the line which I think an explanation of these phenomena will take.

I do not quite deny the possibility of other and perhaps even less known reasons. I sometimes fancy that there is such a thing as irregular fertility of parents during successive seasons, caused perhaps by climatic or other conditions, that in certain years far more ova are deposited than in others per imago, but of course this is merely unsupported hypothesis. Nature does not too readily yield up her secrets, and when we can explain why damson trees which in this part of the country bear usually but an indifferent crop, should once in ten years or so, be almost borne to the ground over a whole country side with exceptional abundance, without the slightest traceable reason, then we may be able to understand a little better than at present why *Edusa* should have swarmed everywhere in 1877, and *Galii* in its own particular haunts in 1888.

Hallwood, Ledsham.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

April 3rd, 1889.—Mr. F. DU-CANE-GODMAN, M.A., F.R.S., Vice-President, in the chair.

Mr. A. Cant, of 93, Robert Street, Regent's Park, N.W.; Mr. C. Cave, of 13, Lowndes Square, S.W.; Mr. N. F. Dobrée, of The New Walk, Beverley; Mr. J. Harrison, of Gawber Road, Barnsley; Mr. S. L. Mosley, of Beaumont Park, Huddersfield; and Mr. B. G. Nevinson, M.A., F.Z.S., of 6, Tite Street, Chelsea, S.W., were elected Fellows.

Mr. Osbert Salvin exhibited specimens of *Ornithoptera trojana*, Staud., and *O. plateni*, Staud., received from Dr. Staudinger, and obtained in Palawan, an island between Borneo and the Philippines. He remarked that *Ornithoptera trojana* was allied to *O. brookiana*, Wall.

Mr. R. M'Lachlan exhibited, and made remarks on, seven examples of *Æschna borealis*, Zett., a little-known species of European Dragonfly. He said that some of the specimens were captured by himself at Rannoch, Scotland, in June, 1865, when he was accompanied by Dr. Sharp and the late Mr. E. C. Rye. The other specimens were taken in Lulea, North Sweden, and the Upper Engadine (5000—6000 ft.), in Switzerland.

Mr. W. H. B. Fletcher exhibited specimens of *Agrotis pyrophila* from various localities, including two from Portland, three from Forbes of a smaller and darker form taken by Mr. Salvage last year, and a melanic specimen from Stornaway, at first supposed to belong to *A. lucerneæ*, but which, on closer examination was seen to be referable to this species. He also exhibited series of *Triphana orbona* from Stornoway and Forbes, and *T. subsequa* from Forbes and the New Forest. The specimens of *T. subsequa* from Forbes were more distinctly and richly marked than those from the New Forest, and were also rather more variable in colour.

Dr. Sharp exhibited specimens of *Proculus goryi*, Kaup, found by Mr. Champion in Guatemala, prepared to show the rudimentary wings under the soldered elytra. Dr. Sharp called attention to the existence of a peculiar articulated papilla at the base of one of the mandibles; and he also showed sections of the head of *Neleus interruptus* displaying this papilla, as well as the articulated teeth on the mandibles.

The Rev. Canon Fowler exhibited specimens of *Agapanthia lineatocollis*, Don, and remarked that they were able to produce a distinct stridulation by the movement of the head against the prothorax, and of the hinder part of the prothorax against the mesothorax; they were also able to produce an unpleasant scent. He further remarked that Dr. Chapman had lately informed him that *Erirrhinus maculatus*, F., had the power of stridulating strongly developed. He also exhibited a specimen of *Barynotus*, taken in Norfolk, which was apparently an abnormal example of *B. obscurus*.

Mr. Edward Saunders exhibited, on behalf of Mr. G. A. J. Rothney, in illustration of his paper on Indian Ants, specimens of the following:—*Camponotus compressus*

and fragments of *Solenopsis geminatus* destroyed by it; *Camponotus* sp.?, with a mimicking spider (*Salticus* sp.); *Pseudomyrma bicolor*, with its mimicking *Salticus*, and a new species of *Rhinopsis*, viz. *ruficornis*, Cameroon, also found with it, and closely resembling its host; *Diacamma vagans*, *Holcomyrme indicus*; with specimens of the grain which it stores and the chaff which it rejects; and *Aphænogaster* sp., with the pieces of *Mimosa*, &c., with which it covers its nest.

Mr. G. A. J. Rothney communicated a paper entitled "Notes on Indian Ants."

Mr. Lionel de Nicéville communicated a paper entitled "Notes regarding *Delias sanaca*, Moore, a Western Himalayan Butterfly."

Capt. H. J. Elwes communicated a note in support of the views expressed by Mr. de Nicéville in his paper.—H. GOSS and W. W. FOWLER, *Joint Hon. Secs.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

The Pocket-box Exhibition in connection with this Society took place on March 21st, at the Albion Hall, London Wall, E.C. The exhibits were of a variable and highly interesting character; but many of them were certainly too large to be properly styled "pocket-boxes," nevertheless, they proved of great service in helping to fill the spacious tables provided for the occasion. The following were some of the most noticeable:—Mr. E. Cooke, 10 cases, containing a splendid collection of birds' eggs, several cases and shades of brilliant exotic butterflies, fine bred series of *A. alni* and *E. autumnaria*, and a specimen of the now rare *N. subrosea*. Mr. J. A. Clark, a large case of Scotch lepidoptera, including long series of *T. orbona*, *C. flavicornis*, *N. glareosa*, *N. rubi*, &c. Mr. Ashmead's case of exotic lepidoptera was much admired, and contained specimens of *Ornithoptera Brookiana*. Mr. Hollis exhibited an example of *C. nerii*, taken on London Bridge, in October, 1888, also series of *E. cribrum* and *P. sicula*. Mr. Bryant, well preserved larvæ of *A. adippe*. Mr. Pearson's life-histories of lepidoptera showed great care in their arrangement, in many instances the parasites were added. Mr. Conquest exhibited a black var. of *L. sybilla*, and a series of *T. cratægana*. Mr. Levett, a peculiar variety of *S. hyperanthus* (underside), the fore-wings without ocelli, the hind-wings with white dots only. Mr. Goldthwaite, a variety of *A. grossulariata*, nearly white, varieties of *B. repandata*, *B. rhomboidaria*, &c., and an exceedingly fine bred series of *A. imitaria*. Mr. Bellamy's three cases of Asiatic lepidoptera and coleoptera attracted considerable attention, among the latter order were several large specimens of Cicindelidæ from North China. Messrs. Hockett, Williams, and Mera, exhibited a large number of *A. prunaria*, including almost every possible variety of this insect. Mr. Hockett also had a large case of *A. grossulariata*. Mr. Boden's box of Micros contained a nice series of *A. pygmæana*; the same gentleman likewise exhibited a fine series of *N. hispidaria*, a nearly black *P. pilosaria*, and a dark series of *T. gracilis*. Mr. Gates, a case Micro-Lepidoptera. Dr. Sequeira's collection of insects taken in the New Forest last year included *A. paphia*, var. *valezina*, *M. alternata*, *N. trepida*, &c. Mr. Mellor, a var. of *C. or*, the margin of the fore-wing bordered with light clay colour, remainder of wing dark.

Mr. Manley, large specimens of *C. edusa*. Mr. R. W. Thompson's two cases contained seventeen species of butterflies, including *Huntera* and *plexippus*, captured by his sister in her garden at Greensborough, Alabama, U.S.A. These handsome specimens were all caught at Linnia blossoms, which had been specially grown for the purpose of attracting them. Other exhibitions of lepidoptera were Messrs. Hanes, Lusby, and Muncer. Mr. Battley exhibited a perfect example of wasps' nest, obtained at Southgate, Middlesex. Mr. Phipos, legbones of giraffe and articles manufactured therefrom. An important feature of the Exhibition was the fine display of coleoptera, comprising representatives of nearly all the British species. The four large drawers exhibited by Mr. E. A. Newbery contained many rare species of the groups Rhynchophora and Phytophaga; while Mr. Cripps showed Geodephaga, noticeable among which was a specimen of *Carabus monilis*, var. *consitus*, taken near Dover last season. Mr. Jarvis' well arranged typical collection included coleoptera, diptera, homoptera, &c. Mr. Lewcock's exhibit comprised the genera Necrophoros and Silpha, 32 species of Longicornia, and the group Lamellicornia. Mr. J. A. Clark, several species of aquatic coleoptera, and three specimens of *Molytes germanus*. Special mention must be made of Mr. F. Milton's dragonflies, which had been preserved in such a manner as to retain their natural colouring. The same exhibitor also contributed coleoptera, orthoptera, hemiptera, &c. Mr. Robson's numerous pocket-boxes came in for a full share of attention from the coleopterists, and contained many northern species. Included in this exhibit were a fine series of *Astynomus ædilis*, *Pissodes pini*, *Rhagium indigator*, *Anomala Frischi*, several of the larger species of the genus Silpha, and insects from the North-east coast of Durham. Several drawers of the Society's collections of lepidoptera and birds' eggs were on view during the evening.

April 4th.—Mr. Huckett, Vice-President, in the chair. Messrs. C. Boden and G. Bryant were elected members. Messrs. Battley and Huckett exhibited a large number of *H. progemmaria*, the combined series of specimens forming a scale of variation ranging from light buff to a deep sooty brown: Mr. Huckett also exhibited a series of *E. togata*. Mr. Bellamy, a long and variable series of *C. trapezina*. Mr. Hanes, a series of *N. hispidaria*, one specimen having the fore-wings quite black, without a trace of the usual band. Mr. J. A. Clark produced a packet of Dr. Jenner's Food which had been attacked by a species of beetle, *Anobium paniceum*. The packet was perforated through and through as if it had been shot, and both larva and beetle could be seen in abundance. Mr. Clark stated that a great quantity of the food stored in his warehouse had been destroyed in a similar way to the packet exhibited. Mr. Lewcock also spoke on the subject. Mr. F. Milton's box contained, among other things, several banded species of Necrophoros, including *N. rufipator*. Mr. Lewcock exhibited some Longicorns, captured by Mr. C. Boden during last season, the most noticeable being *Toxotus meridianus*, *Rhagium bifasciatum*, *R. inquisitor*, and *Strangalia armata*; also a specimen of *Asemum striatum*, received from Mr. Robson, Hartlepool.—E. HANES and G. A. LEWCOCK, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

March 28th, 1889.—T. R. BILLUPS, Esq., F.E.S., President, in the chair. Messrs. J. E. Cutts, of Watford; W. T. Sturt, of Kingston; and W. G. Macmurdo, of Wansted, were elected members. Mr. Hawes exhibited a variety of *Epinephele janira*, with additional spots on the primaries, and two varieties of *Zygana filipendula*, both having the central spots and the upper spot of the outer pair absent, and the inner pair of spots being very much contracted; the two examples were captured in July, 1876, near Oakleigh Park. Mr. Tugwell, specimens of *Deilephila galii*, bred by him from a large number of larvæ taken at Deal, in 1888, together with continental examples of the species, and remarked that the most probable explanation of the unusual abundance of *D. galii*, last season, was that of immigration. Mr. Billups exhibited exotic Orthoptera, Hemiptera, and Homoptera, and three species of Coleoptera:—*Sagra buquetii*, from Java; *S. chrysoclora*, from Australasia; and *S. cæruleata*, from Madagascar. Mr. W. West, two specimens of *Calosoma sycophanta*, (male and female), one captured 1873, Freshwater Bay, and the other in Greenwich Park, 1888. The remainder of the evening was devoted to an exhibition of microscopical objects by the members.

April 11th, 1889.—The President in the chair. Messrs. A. W. Dennis, of Kingsland; and G. E. Dench, of Tufnell Park, were elected members. Mr. Tugwell exhibited a bred series of *Nyssia hispidaria*, shewing extreme form of dark coloration, and a bred series of *Tæniocampa leucographa*. Mr. R. Adkin, *Euchoromia mygindana*, *E. arbutella*, *Coccyx nemorivaga*, bred from larvæ in shoots of the common bearberry *Arctostaphylos uva-ursi*, from Forres. Mr. South, series of *Plusia iota*, including two of the variety *Percontationis*; *P. pulchrina*, and made some remarks on the differences between the two species; two series of *Epunda lichenea*, one from Plymouth and the other from Portland; the specimens from the first mentioned locality were fairly typical, the others were small greenish gray specimens with but little if any of the pink or reddish tinge characteristic of the type; *Eubolia mensuraria* and *Fidonia piniaria*, from various localities, and made observations thereon. Mr. Jenner Weir, some butterflies which he had desquamated by the "Waterhouse process," and remarked that although the scales of the wings were dissolved yet the hairs remained unaffected, and that the green pattern on the wings of such butterflies as *Papilio lurhinus* and *Zirumala petiverana*, retained their colour after the desquamation, the markings were not merely superficial in these insects. A paper, "On the Origin of the genus *Anthocharis*," by Mr. T. D. A. Cockerell, was read. Mr. Cockerell was of opinion that the genus *Anthocharis* was by no means an ancient genus, and that it arose directly from an old *Pieris* stock and that probably on the American continent. Mr. Weir, Mr. South, and Mr. Tutt made some observations on Mr. Cockerell's paper. Mr. Wilkinson exhibited several species of scorpions, and Mr. W. White examples of some of the larger species of Arachnida.—H. W. BARKER, Hon. Sec.

Gossiping Notes on British Coleoptera.

By G. A. LEWCOCK.

I. SYNONYMY.

After the recent interesting historical account of the Nomenclature of Coleoptera, I am afraid that my contribution to the pages of the *Young Naturalist* on a kindred subject will seem somewhat tame and common place. However, there is one thing arising from the paper to which the attention of Coleopterists might be advantageously directed, and it is a question which often perplexed and puzzled many of our young students, namely the synonymy of the various orders of Entomology. Now, of recent years, we have experienced many changes of nomenclature, and entomologists, as a rule, are decidedly averse to these changes, and this is more especially the case with those who for long years have accustomed themselves to the use of a certain list. Instance of this, occurred to myself but a short time ago, when interchanging duplicates with another coleopterist. I wrote to a correspondent, asking him what list he used, adding that I preferred Fowler and Matthews' catalogue for neatness of printing, although I adopted Dr. Sharp's catalogue for classification. The reply was short and decisive:—"I have used Waterhouse's catalogue for years, and I am not going on other people's lines now." This sentiment, I think, may be taken as a fair sample of that which prevades the entire entomological world, and this remark will, I feel sure, be fully endorsed by lepidopterists in general. As another case in point, I need but refer to the dissatisfaction expressed with Mr. South's "List of British Lepidoptera," chiefly owing to the extensive alterations which had been made in the nomenclature of Doubleday's list. Now, whether this feeling arises from what is termed "Insular prejudice," or otherwise, I leave every one to form their own opinion; but, speaking for myself, I am inclined to think that it is not attributable to "prejudice." This much I do say, that the majority of persons who collect insects in this country are much more interested in indigenous than foreign species, because, except for the intermittent occurrence of a few stragglers, the latter are not within easy reach of their net, and, therefore, the fact of the British list not being in strict accordance with that of the continental authorities is a matter of no consequence to them and one of the last things they would care about. Having once named their specimens by a standard list, they would prefer keeping to that list, because the names are to a great extent

fixed in their memories, and they object to the trouble which a change of name which would entail on them. This may in some measure account for the remark made a few days ago by an eminent lepidopterist in writing on Hufnägel's types, he refers incidentally to "*those whose knowledge did not extend beyond the limits of our ordinary Exchange lists.*" That there are many such persons whose knowledge is thus limited, doubtless is true enough; yet the probable reason for this may be found in the complexity and confusion consequent on a multiplicity of lists. At the same time we must bear in mind that in the study of coleoptera synonymy is of the utmost importance, owing to our habitual intercourse with continental authorities, and this necessitates an uniformity of nomenclature in order to arrive at a proper understanding in the determination of any insect, on which we may desire their opinion. In deciding on the name by which a certain insect shall be hereafter known, it is always understood that the name given by the person who first described that insect shall have the priority over all others. Sometimes it happens that an insect has again been described by a second person as a new species and the second name has passed current for a period; when this is discovered a change of names is considered to be necessary. But this system of changing the nomenclature according to the "Laws of Priority" may sometimes be carried too far, as clearly demonstrated by Canon Fowler in the preface to his excellent work on "The Coleoptera of the British Islands," the volumes of which are now in course of issue from the press. As the passage I refer to strikes at the root of the system, I cannot do better than quote it at length:—"The question of nomenclature is at present in such a confused and transitory position that I have preferred to follow the old and well-known system rather than adopt the changes that have been so largely introduced into the European catalogue: I have, therefore, altered very few names, but have in most cases appended the newly revived names as synonyms, and referred to them in the index, so that few mistakes can arise. It appears to me that nothing but utter confusion can result from the present passion for the law of absolute priority, and in this I am borne out by Dr. Sharp's recent paper "On some Proposed Transfers of Names of Genera" (Transactions Ent. Soc. London, 1886, p. ii., 181), which was written in answer to a pamphlet by M. des Gozis, entitled "*Recherche de l'Espèce typique de quelques anciens genres.*" Under the new system *Necrophorus* becomes *Silpha*, and *Silpha Necrophorus*; *Pracrustes* becomes *Carabus*, *Carabus* is changed to *Tachypus*, and *Tachypus*, requiring a new name, is called *Asaphidion*;

even *Melolontha* is found to relate to *Clythra*, and our common cockchafer becomes *Ludibrius vulgaris*; the genus *Homalota*, moreover, is found to comprise but one single species. These instances will show the utter confusion that would arise, and I certainly do not feel justified in adopting these radical changes, the utility of which is so very doubtful, and which in many cases are evidently erroneous, as we often have no means of judging from the very meagre descriptions of the old authors what the insect really was that they described and named."

A curious instance of the mystification which sometimes arises in the matter of nomenclature is thus related by Mr. T. D. A. Cockerell (Colorado), in "Hardwick's Science Gossip," xxiv., 276:—"There is much discussion going on on this side of the water among botanists, about the citation of authorities after specific names, and even the right of priority of these names seems to be called into question. For instance, in "Botanical Gazette," 1888, p. 234, we have some remarks by Mr. F. L. Scribner: "Pursh described *Stipa membranacea*; Thurber, ignorant (as almost every one was) of Pursh's name, called it *Eriocoma cuspidata*; it turns out to be an *Oryzopsis*; ought Scribner to go back to Pursh's specific name *Membranacea*, or is he right in calling it *Oryzopsis cuspidata*, Scrib.? Now here is a strangely confused state of affairs—the prior name and prior author lost sight of altogether, and a new name adopted simply because the original generic determination was incorrect! Surely if there is to be any uniformity between zoological and botanical nomenclature, the grass must be called *Oryzopsis membranacea* Pursh; or, if preferred, the authority can be written "(Pursh) Scrib.," to show that Scribner first called it an *Oryzopsis*."

A fitting addenda to the above I take from Robson and Gardner's "List of British Lepidoptera and their Varieties":—"From all this only one deliverance can be looked for. It is no use an individual, particularly one unknown in the entomological world, attempting to produce a catalogue that will be satisfactory to everyone. The leading Societies of the various countries where Entomology is largely followed, must arrange for the preparation of a list, which shall be finally binding on everyone, and whose nomenclature shall be subject to no further alteration. For this we must wait and hope."

(To be continued).

Notes and Observations.

EARLY NESTING.—On March 30th, I found two song thrushes' nests, with four eggs in each. One lot was very nearly hatched. A friend of mine also found a nutcracker's nest with eggs. Is not this rather earlier than usual? The robins and jackdaws have been hard at work at their nests for some time.—D. H. STEWART, Oxford.

ENTOMOLOGICAL NOMENCLATURE AND HUFNÄGEL'S DESCRIPTIONS.—By the kindness of a good friend I have seen a paper on "Hufnägel's Types" in the *Entomologist*, Vol. 22, page 109, and it is proof that Hufnägel's names ought never to have been dug up, much less ought they to have been used to supersede names with good figures and good descriptions, which we all could understand. What stronger evidence could there be that Hufnägel's description cannot be comprehended than that the translator of them has had to excuse them because they were old, and to explain them because they do not explain themselves. I confess, a description "partly bluish, partly light, partly dark grey, with a latin W on the hind-margin," gives me no idea what moth is intended, because I have never seen a phalæna, Foreign or British, to which such an obscure description would apply. The same remarks apply to the next insect "brownish grey" (if there ever was such a colour) "with white and yellow markings, which are generally surrounded with brown." "Hind-wings light yellow, with a broad brown margin." The last remark just recalls to my mind the Yellow under-wing, not the *light* yellow under-wing! For the life of me I can't tell which, because I do not know how big "the first size" is; but, if any one can tell from "yellowish grey with two brown curved and toothed and two wavy transverse lines of the third size" that our present *A. cursoria* is meant, I throw up my hat to him and take a back seat. No one ever doubted the existence of these ancient so-called descriptions in the "Berlin Magazine," but every person of standing in amateur entomology doubted, nay, objected to such rubbish being forced upon us. Guénee, in the introduction to his great work on the "Noctuæ of the World" observed, "that when figures or descriptions in old books were crude or bad, he did not follow them," &c., and all the entomologists since then have followed the same good plan, and even those who use them require a *saving clause*, as in the last line, where our friend says "there is LITTLE doubt in my mind that Staudinger was right," &c., still there is a little doubt, and as Josh Billings so tersely puts it, "when there is enny doubt about ennything, you may depend upon the doubt." I have read and re-read this article, but am not enlightened by it one little bit, further than that I am certainly confirmed by it in my opinion that it is simply folly to dig up this old rubbish. A mischievous elf at my elbow offers me a leather medal if I can name a moth from the following description, partly bluish, partly light, partly dark grey, with a latin W on the hind-margin." I have given it up, and yet it seems an easier riddle than many Hufnägel set in the old time!—C. S. GREGSON, Liverpool, 12th April, 1888.

EPUNDA LICHENEA.—A NEW FOOD-PLANT.—On the 8th instant I was looking over an old green-house when *Linaria cymbalaria* was permitted to grow and trail along on the shelves behind the flower pots, when my attention was arrested by seeing a number of leafless stems standing erect, and in searching for the cause, I removed several pots and behind each, among the ivy-leaved snapdragon, I found the culprits, a dozen *Epunda lichenea*; this plant has not hitherto been recorded as food for this larva.—G. C. BIGNELL, 7, Clarence Place, Stonehouse, Plymouth, 11th April, 1889.

NYSSIA HISPIDARIA NEAR COVENTRY.—Being informed that *N. hispidaria* was to be taken here, I made up my mind to go in search of it this season, and have been successful in obtaining it. On paying two visits to Coombe Wood, which is about five miles from Coventry, on the 16th and 23rd of March, and diligently searching some hundreds of oak trees, I obtained ten males and four females, one of which has deposited a goodly number of eggs. I also took fourteen good specimens of *Leucophearia*, one *A. æscularia*, and a few *P. pilosaria*. Sugar-ing a few trees at night brought a few *S. satellitia* and *C. spadicea* which were getting worn.—FRANK BURROWS, Coventry.

FIRST CAPTURES.—*H. rupicaprvaria* and *leucophearia* have been very plentiful, *A. derivata* and *A. æscularia*, are abundant now, especially the latter. The weather has been exceptionally mild here.—D. H. STEWART, Oxford, April 3rd, 1889.

Correspondence.

HUYTON PARK, HUYTON,
April 9th, 1889.

To the Editor of *The Young Naturalist*.

SIR,—Mr. Briggs is quite correct in saying that the specimen of *L. meliloti* in the late Mr. Owen's collection, bred from larva taken by myself in the New Forest, does not in anyway help the solution of the question in dispute as to whether it is a true species. The history of the insect is simply this. When collecting lepidoptera in the New Forest some years ago, I was in the habit of each evening sending by post to my friend Mr. Owen all the larvæ I had gathered together during the day, as I had no time to attend to them. Amongst sundry larvæ sent were some *L. meliloti*. I feel, however, that there is a great deal to be learnt from the careful microscopical examination of the genital organs of the lepidoptera. The first person I believe who drew attention to this subject was my late friend Mr. Benjamin Cooke, than whom I never met with a keener entomological investigator. Unfortunately, he was one of those reserved persons who kept his investigations to himself, which was a great loss to Entomology. We had the advantage of a most interesting lecture on the subject, at one of the early meetings of the Lancashire and Cheshire Entomological Society, when he communicated the result of many years investigations on the subject. He was fully convinced that in the examination of these organs we were in the right direction for the determination of species, and I think he would have published, when mature, all his experience, had not his premature death occurred. I think much of Mr. Pierce's investigations, as I believe they were made without the knowledge that any one else had drawn attention to this interesting study, and I must heartily wish him and all others engaged in it every success.

—Yours truly,

SAMUEL JAMES CAPPER.

The Determination of Species of Lepidoptera by examination of their Anal Appendages.

By F. N. PIERCE.

I have read with much interest, Mr. C. A. Briggs' article on my paper, and feel complimented with the remarks on my patience, &c. No doubt to sift this matter to the bottom requires a deal of time and trouble, but my idea was not the identification of individual specimens of lepidoptera by these means, but the determination of species in this order. Fortunately for many entomologists, the markings on the wings are quite sufficient, as a rule, to identify specimens.

Mr. Briggs speaks of the plan being practically useless as regards the *Zyganidæ*, but a species is not generally composed of a single specimen; if every variety is to be considered a species, until proved to the contrary, we should soon be in a mess. In fact, I question very much if unique specimens are often distinct species.

With regard to Mr. Briggs' queries. If I understand the first question rightly, he wishes to know if there is any difference in the organs of fresh dead and dried specimens? None.

If any difference could be caused by pairing? I will answer this more fully afterwards. I have tried captured males, generally worn, and therefore likely to have paired, and also bred specimens, that had not paired, but there is no difference.

Whether all the specimens were of the same age, and that all had or had not paired? I understood it was generally accepted that insects did not grow after the final transformation, therefore, I should think it was impossible for organs to develop with age. A plate would answer this better than pages of words. Had I been able to draw, figures of the parts would have appeared with my article, unfortunately, I am not gifted like the author of "Wings"; but I will see if something cannot be done by photography to supply this defect.

I cannot see how pairing can alter structure. If Mr. Briggs is taking the plates of Dr. Buchanan White and others as examples of my work, he is making a mistake, as they are based on totally different principles. If an organ is not dentated before pairing it is obviously impossible that any such change in its structure can arise after the act of impregnation. If one of the appendages has two hooks before, can it have four after, or *vice versa*; and as the parts are mostly composed of chitine, it is difficult to believe it can even alter shape.

Mr. Briggs asks how many specimens were experimented upon. I admit this should have been stated, but I never expected that any one would for a moment imagine that I, or any one else, would base their arguments on the examination of single specimens. At first, I tried many specimens, a dozen or eighteen, and found in every case absolutely no difference in the structure of the genital organs; this being so, I contented myself afterwards with two or three specimens, as to take more would be a useless waste of the time at my disposal. As regards *Exulans*, I had a plentiful supply to experiment upon, which I certainly did not spare. I have other ideas of an entomologist than the mere massing of a cabinet series, as my collection will testify, by the hundreds of specimens minus their bodies.

Mr. Briggs states the whole of our *Zyganidæ* are not only thoroughly well known in all their stages, but are fully described and figured by Continental authors, &c., this being so, how is it Mr. Briggs can take part in a controversy continued for *seven months*, on "What is our New Forest *Meliloti*?" if he could have instantly settled it, by his authors of lasting renown, *if* they were as infallible as he would make out. In Vol. VIII, *Y.N.*, p. 224, Mr. Sydney Webb considers *Meliloti* to be a form of *Trifolii*. Here is an entomologist who evidently does not consider these authors indisputable. In Vol. IX, *Y.N.*, p. 54, Mr. Tugwell states his belief, the four species are forms of one species. Another entomologist who does not blindly follow these authors. In Vol. IX, *Y.N.*, p. 82, Mr. Robson scarcely thinks *Trifolii* and *Meliloti* to be distinct. Still, a third entomologist who considers he has a right to an opinion of his own. In Vol. IX, *Y.N.*, p. 82, Mr. Briggs gives the history of breeding *Meliloti* and says, "New Forest *Meliloti* produced unmistakeable *Trifolii*," and "*Meliloti* are but a degenerate form of *Trifolii*," and in the present volume, p. 72, states, that it, viz.: our New Forest *Meliloti*, has been described and figured by Hubner, Esper, and Ochsenheimer, as well as our own writers. Surely Mr. Briggs sees that there are some statements made by these authors of lasting renown, which he cannot reconcile with his own experience. If Mr. Briggs settled the question 13 years ago that *Meliloti* was *Trifolii*, how is it that the name has not been altered in our lists and collections?

In reply to Mr. Jenner Weir, I have seen most of the works referred to. In my paper I do not state that nothing has been done with the genital organs of the lepidoptera, but that, as far as I know, nothing has been done in the way I suggest; I am sure he will at once see the difference between a minute microscopic examination and a superficial view with a simple lens.

Our Pterophori.

By C. A. BRIGGS.

Mr. South having, partly in the *Entomologist* and partly in the last number of the *Young Naturalist*, answered such portions of my note in the March number of the *Young Naturalist* as he finds convenient, abandons the rest as not being serious, or as he puts it, being "useless chaff." Chaffing to a certain extent it was in its mode of expression, but the chaff had a serious purpose underlying it, namely to protest against the constant changes in the names of our Pterophori, that, with such inadequate foundation, have recently been made,—so hastily and yet so positively.

Mr. South says that I am inaccurate as to facts, and consequently, either insincere or ignorant. Passing over without comment these somewhat unusually strong expressions, I admit that sometimes on reading his papers consecutively, I fail both to grasp his process of reasoning and his real conclusion, as the papers sometimes, when not absolutely contradictory, are far from clear, and it is always hard to remember what particular view is for the moment in the ascendant. *Tæniadactylus*, for instance, first blossomed forth as a novelty; next it was telescoped into *Zetterstedtii*; now it is said to be *Nemoralis*, what it will next be time only will shew, but each of these views was brought forward at the time as a fact to be accepted, and consequently unfortunately was believed. Hence the confusion that has always hung round this unlucky creature.

Lætus too has caused great trouble by the fluctuations of its names. First the Thetford specimens are announced as *Lætus*; then in October, 1881, and January, 1882, Dr. Jordon and Mr. Barrett agree that these are *Distans*, and Mr. Barrett and Professor Zeller agree that *Distans* and *Lætus* are forms of the same—so far all was clear. But in February, 1882, Mr. South, on the strength of his North Devon specimens, ignores this conclusion and re-introduces to our list *Lætus* as a distinct species, and leaves it there till 1889, actually inserting it as a species in the "Entomological List" without even a query, in spite of the expressed opinions of Professor Zeller and Mr. Barrett, that *Distans* and *Lætus* were one. I confess that in the confusion caused by this singular proceeding I had overlooked Mr. Barrett's remark that his Folkestone specimens were identical with continental *Lætus*, and was under the impression that these specimens were identical with the pale second-brood Brandon specimens. Now, Mr. South again merges *Lætus* for the present.

As to *Bipunctidactylus* and *Plagiodactylus*, I think that most of us have a lively recollection of the heated controversy on the question of their identity, and must decline to re-open it by adopting the suggestion of giving the verification asked for.

In E.M.M. XVIII, p.p. 122 and 180, Dr. Jordan and Mr. C. G. Barrett give their opinion that *Hodgkinsoni* is a variety of *Loewii* (*Zophodactylus*). Now, Mr. South again ignores these authorities, and without even having seen *Hodgkinsoni* publishes his opinion that it is a form of *Bipunctidactylus* rather than *Loewii*. This may be what he calls an honest attempt at elucidation, but it seems to me rather calculated to result in a most uncalled for confusion. After he has seen a specimen, his opinion, if still the same, may be weighed against Dr. Jordan's and Mr. Barrett's, but not before.

With regard to *P. zetterstedtii* the chief question seems to resolve itself into a difference of opinion between Mr. South and Professor Zeller. Mr. South cannot, or does not, see any difference between *Zetterstedtii* and *Gonodactylus*, while Professor Zeller could or did see it. Are we therefore justified at present in assuming that Mr. South is right and Professor Zeller wrong? Are we to gather from Mr. South's last contribution to the *Entomologist*, that Professor Zeller founded his species on the single specimen referred to? I doubt if Professor Zeller was really guilty of such a thing—with species so closely allied, it seems too risky as well as bold, to decide from one specimen, as Mr. South seems to imply was done here; and as Mr. South himself has done with Haworth's *Heterodactylus*, and with the original Devon *Nemoralis*, one female specimen of which he compared (*Entomologist*, XV, p. 34,) with a solitary, and not very good Continental specimen, and the conclusion immediately was drawn and published unhesitatingly. Possibly, inspection of a representative series of Continental *Zetterstedtii* might shake Mr. South's opinion, and if so, exit *Nemoralis* and enter—what?

With regard to *Teucriti*, I must repeat that *Heterodactylus* being De Villers name, we cannot re-introduce it without some real evidences to show what De Villers' insect was. His description (alis patentibus fassis, nigris, maculis albis) is so vague that it might equally apply to many of the group; indeed, the word nigris would much more suit *Brachydactylus* than *Teucriti*.

Mr. South shews a very natural desire to shirk the matter, and shift from himself the *onus probandi*, which lies on anyone who proposes a change in nomenclature. His argument seems to be, that because *Heterodactylus* of Haworth may be the same as *Heterodactylus* of De

Villers we are bound to jump to the conclusion that it *must* be so. A method of reasoning not usually accepted, though it would account for some of the singularities in the Entomological List.

55, *Lincoln's Inn Fields*, 16th April, 1889.

Notes on the probable origin of last year's *Deilephila Galii*, W.V.

By W. H. TUGWELL.

The extraordinary number of larvæ of *D. galii* that were found in various parts of England last season, naturally re-opens the old question of their probable origin. It is hard to believe that this large and handsome larva, one that always feeds in the broad, open daylight, could be overlooked year after year by the many collectors always on the look out for it. In such well-worked spots as Deal and Wallasey sand hills hardly a day passes without being searched.

The so-called "blown-over theory" is perhaps very generally accepted, still it has never been settled by proof, merely probabilities. Lately I have been collecting information, that to my mind very materially strengthens if not confirms this view, as the following facts will show.

In February last, I exhibited at the South London Natural History and Entomological Society, a short but fine series of *D. galii*, that I had forced out from the larvæ I had captured at Deal last September. After the meeting, one of our members (Mr. F. Oswald) came to me saying how much he had admired my exhibit, but continued he, "are they not extremely small?" This surprised me greatly, as I thought my specimens the largest bred English examples I had ever seen. Afterwards, on thinking the matter over, I remembered that my friend Mr. J. T. Williams, who in company with Mr. Oswald, had captured 18 specimens of *Galii* in St. Margaret's Bay, had also spoken of their great size. I wrote Mr. Williams to kindly send me on the measurement of his captured males and females, and on getting these, the size was so surprising, I determined to write to others who had taken them.

Continental *Galii* are generally much larger than English bred specimens. Mr. R. South tells me there are two emergences (broods) on the Continent, that of July being a larger and bolder type than those later in the autumn. The July insects measure, males, 3 ins: to

$3\frac{1}{8}$ ins. and females from 3 ins. to nearly $3\frac{1}{2}$ ins. The late autumn emergences are smaller type, about the average size of our English form. It seemed to me desirable to obtain measurements of as many caught imagines as possible, and also from those gentlemen who had bred the insect from Kent, Essex, Lancashire, &c. These data certainly go a long way to prove that the bulk of 1888 imagines were in all probability from a continental immigration.

Continental *D. galii* Females, July emergence, measure 3 ins. to $3\frac{3}{8}$ ins.

„ „ Males, „ „ 3 ins. to $3\frac{1}{8}$ ins.
Caught imagines (18) St. Margarets, Females, $3\frac{1}{8}$ ins. to $3\frac{3}{8}$ ins.

„ „ „ Males, 3 ins., one larger not measured.

„ „ Kingsdown, Females, 3 ins. full.

„ „ Dartford, Males, 3 ins. full.

„ „ Stoney Stratford, Females, 3 ins. full.

„ „ Aberdeen, Females, $3\frac{1}{4}$ ins.

„ „ Dublin, Males, $2\frac{7}{10}$ ins.

„ „ Dundee, Males, $2\frac{5}{8}$ ins.

Thus it will be seen that all the measurement I have been able to obtain, with the exception of the two males, one from Dublin and one from Dundee, all measure at least 3 ins., and up to $3\frac{3}{8}$ ins.

Now, from a large number of specimens bred from English fed larvæ, very few indeed reach 3 ins. Mr. S. J. Capper very kindly made full enquiries in the Liverpool district, but could not get information on any caught imagines in 1888, but from himself and friends he has supplied measurements of the bred examples.

Bred from English fed larvæ by Mr. Capper :—

Liverpool, *one* exceptionally large female $3\frac{1}{6}$ ins.

„ average females, $2\frac{5}{8}$ ins., smallest $2\frac{1}{3}$ ins.; largest males, 2 ins. 10 lines, smallest 2 ins. 4 lines. Mr.

Capper remarked, “very few are 3 ins!”

Bred from Deal larvæ by W. H. Tugwell, *one* female is $3\frac{1}{16}$ ins., very few are 3 ins., average $2\frac{5}{8}$ ins.

„ „ males, largest $2\frac{5}{8}$ ins., average $2\frac{1}{2}$ ins.

„ Essex by Mr. J. A. Cooper, females largest $2\frac{5}{8}$ ins.

„ „ males, largest $2\frac{3}{8}$ ins.

These figures clearly show the caught imagines average fully $\frac{3}{8}$ of an inch expanse of wing more, and proportionally robust too, than any bred from English fed larvæ. Some may say, “Ah! but bred insects are often smaller.” To this I will reply, That quite a large

number of my larvæ were full-fed when found. So that these could not have been dwarfed by breeding, and the whole of them were full-fed under especially favourable circumstances. Then again, it may be argued that forcing may have had a tendency to making them smaller. But this I cannot admit, as once an insect is in pupæ it does not grow, *i.e.* become larger. By undue forcing you may possibly produce undeveloped organs, ova may not be fully formed, as is known to be the case with *Acherontia atropos*, when forced out in the autumn; but still the insect is as large as if it had remained in pupa until the spring.

Not only are the bred specimens of English *Galii* smaller for this year, but it also holds good in those of any previous season, as anyone may prove by measuring specimens in the collection. Of course I do not for a moment say that every caught specimen must of necessity be a continental bred insect, only that when we get insects of abnormal size, we may fairly infer that we have an immigrant. I also think these facts may tend to settle the question of the "blown over theory."

I do not suggest these large and caught specimens have been brought over from the Continent, only that they are part of a migration; and to migration, I fully believe we in England are indebted for many other species, but that the climate does not suit *D. galii*, and which in consequence soon becomes weak and fail to be fully established.

My best thanks are due to those gentlemen who have so kindly sent me the desired information.

6, Lewisham Road, Greenwich.

The Wall-flower (*Cheiranthus cheiri*.)

By J. P. SOUTTER.

"The Wall-flower—the Wall-flower, how beautiful it blooms!
It gleams above the ruined tower, like sunlight over tombs;
It sheds a halo of repose around the wrecks of time—
To beauty give the flaunting rose, the wall-flower is sublime.

Flower of the solitary place! grey ruins golden crown!
Thou lendest melancholy grace to haunts of old renown;
Thou mantlest o'er the battlement, by strife or storm decayed;
And fillest up each envious rent Time's canker-tooth hath made."

As good old Culpeper would say, in the pre-Linnean era of botany—the wall-flower is so well known as to require no description. And certainly few, if any, of our commonly cultivated flowers are better

known, or a more universal favourite. Scarcely a cottage garden is to be seen without its plants of wall-flower, the delicious fragrance of which scents the air in the balmy spring mornings and evenings of April and May. By gardeners the wall-flower is generally treated as a biennial, the seeds are sown in early summer, the young plants being pricked out when large enough to handle, then in late autumn planted out where they are to bloom in spring, and when done flowering they are pulled up and destroyed. If allowed to remain they are usually killed the succeeding winter if the frosts are at all severe. Yet under favourable conditions it will grow and form a large shrubby bush with a woody rootstock, and increasing annually in size. Although now thoroughly naturalised, the wall-flower is not a native of this country, having been introduced from Spain, and its original home is on the rocky shore of the Mediterranean. So that to be seen in its full natural and unaffected beauty it must be viewed adorning craggy precipices or old ruins, where it finds a congenial habitat, and clothes with its grateful loveliness the evidences of man's mouldering handiwork. The famous ruins of Melrose Abbey to wit, have an added charm in the gorgeous colouring of the bright yellow wall-flower, which in great profusion covers the inaccessible walls and roofs in early summer. It seems to revel in the driest situations, the plants growing in the crevices of the wall becoming hard, gnarled, stunted specimens, yet flowering and seeding freely, the dry root-hold preventing them suffering from the winter frost, their greatest enemy, and inducing a slower growth and hardier constitution. It is the rapid luxuriance in rich soil which enfeebles it, so as to make it ready prey to climatic changes. It flourishes freely as far north as the ruins of Kinloss Abbey, on the shores of the Moray Frith.

The wall-flower is a typical representative of the large and well-defined natural order *Cruciferae*, which receives its name and is distinguished by, the cruciate or cross-shaped blossoms. Let us examine a bloom of the common wall-flower. We observe first four green sepals, one pair a trifle larger than the other, and slightly enlarged or swollen at the base. These are easily removed, when the four petals are seen to have rather a long stalk or claw, which gives the corolla a tubular shape, the flat expanded portion or limb spreading outwards crosswise \times . These, too, can be readily detached, leaving the stamens exposed, they are six in number, arranged in two opposite pairs of equal length, with a solitary shorter one between each pair; this arrangement is called tetradynamous, and is one of the botanically characteristic features of the cruciferous flowers. As the

parts of a flower when regular, bear a uniform relation to each other, being equal or double the number, thus with four petals we look for four or eight stamens, and on close inspection there is to be seen the rudiment of an abortive stamen betwixt each long pair. This seems now to have developed the function of a honey-secreting gland to reward the visits of insects, who are attracted by the bright colour and delicious odour of the blossoms. The peculiarly long tube-shaped corolla renders the nectar inaccessible, except to those long-tongued moths whose visits are likely to prove beneficial to the plant. Under cultivation the calyx is often seen to acquire in a considerable degree the hue of the corolla, which aids in making the masses of unexpanded flower buds still more conspicuous. The fruit of the wall-flower is botanically very curious, and is eminently characteristic of the cruciferous order. It is formed of two united carpels making a long pod-like fruit, the interior cavity of which is divided by a thin diaphanous membrane, called a replum, and forming a longitudinal partition, so that when the fruit is mature the two outer coverings open at the base, curl up and fall off, leaving the seeds exposed in two rows on each side of the replum, which remains on the stalk a long time after the seeds have been shed. In certain members of the order, such as the honesty (*Lunaria biennis*), a common plant in cottage gardens, the replum is enormously developed, and when the fruit is well ripened and the seeds dispersed, the replums remain bright and shining like silver shillings, when it forms a useful ornament, like dried grasses for decorative purposes, and like skeleton leaves, becomes a thing of beauty, if not a joy for ever.

As well as highly ornamental and fragrant flowers like the wall-flower and stock, the cruciferæ includes a great number of valuable economic plants, such as the various members of the cabbage family. The immense number of the varieties of which are descended from the original parent cabbage (*Brassica oleraceus*) of our rocky sea shores, forms a striking instance of man's power of originating and perpetuating variations by means of judicious cultivation. There are also the turnips, cresses, mustards, rapes, radishes, &c. Many of these are hot and pungent, but none are poisonous, all may be eaten with impunity, and several are powerful anti-scorbutics and blood purifiers. The old herbalists even credited the wall-flower with being useful for gout and similar diseases, but it has now fallen into disrepute. Poets, however, who are notoriously non-utilitarian, continue to sing its praises. Burns happily indicates its habitat:—

" As I stood by yon roofless tower,
Where the wa'flower scents the dewy air,
Where the howlet mourns in her ivy bower,
And tells the midnight moon her care."

And equally appropriately has Scott, with his characteristic accuracy in describing natural scenery, pictured its congenial home:—

" On barbican and keep of stone,
Stern Time the foeman's work had done ;
Where banners the invader braved,
The harebell now and wall-flower waved."

and again—

" For well the lonely infant knew
Recesses where the wall-flower grew,
And honeysuckle loved to crawl,
O'er the low crag and ruined wall."

It has been well said to mark the decline of the feudal era in this country, as its blossom—

" Decks the rough castle's rifted tower,"

and to attain this end—

" For this, obedient zephyrs bear
Her light seeds round yon turret's mould ;
And undispersed by tempests there,
They rise in vegetable gold."

In the language of flowers it symbolises "Fidelity in misfortune," because it clings to, and clothes crumbling ruins, and thus hides the ravages of Time's defacing fingers. In Palestine, the wall-flower is called the "blood drops of Christ." And its deep hued flowers have originated a similar appellation in various parts of England, particularly in the South-west, where they are known as "bloody warriors," and are planted as a sort of sentinels to protect the house from harm. Another popular name of "bleeding heart" has a similar significance. The generally common name of "wall-flower," although so charmingly appropriate from its characteristic place of growth, is only of comparatively modern adaptation. It was formerly known as one of the "gillyflowers," corrupted into "July-flowers," it being called the "Winter July-flower," because it blossomed in winter. And this name was a corruption from the old French "girofler" or "girofle," which is itself a modification of the Latin "caryophyllum," a clove, a name now restricted to the pinks and carnations. Herrick gives a poetical rendering of the mythological legend as to the origin of the wall-flower:—"An imprisoned and love-lorn lass, seeking to escape to join her lover, fell over the wall and was killed. Jupiter, with a

lively recollection of his own amours, sought to perpetuate her memory by causing the lurid wall-flower to spring from her blood." Alas! for the degeneracy of modern days, when in the slang of the ball-room, ladies who are left to sit alone are known as "wall-flowers"! Spenser speaks of "The pretty pawnee and the *chevisaunce*," or more properly "*cherisaunce*," or "heart's-ease," a name which was then applied to the wall-flower, but which has been transferred in more modern days to the pansy. Chaucer also uses the word in the sense of comfort or heart's-ease. The older botanists called the wall-flower "*Lecceium*," and the present name "*Cheiranthus*" is of comparatively recent date. Its etymology has been traced to the Arabic "*Kheyry*," a name applied to a plant with red and sweet-scented flowers, the affix "*anthos*" a flower, was tacked on, to give it a Greek appearance, and then the whole was taken for a Greek term to mean "*cheir*" the hand, "*anthus*" a flower—a "hand-flower," *i.e.* a flower by reason of its beauty and fragrance worthy to be carried in the hand—to make up into bouquets and nosegays.

The Squirrel.—(*Sciurus vulgaris*).

By W. H. WARNER.

This nimble and interesting little creature frequents the tops of high trees in woods, and is tolerably common in most parts of the country that abound with oak, beech, and fir woods. In pine and fir trees it is perhaps more frequently seen than in others, the dark and heavy foliage affording it both shelter and concealment. Here it may be seen at any time of the day, and on moonlight nights, playing among the boughs, and leaping from branch to branch in its own nimble fashion. Its feats of climbing and jumping are really astonishing, I have seen it run up the almost smooth trunk of the beech with as much celerity as on the ground, and also observed it take flying leaps between small trees a considerable distance apart. When collecting nuts in the fall of the year it will run to the extreme end of the bough or twig, and though borne down by the frail support manage to secure its nut. In these feats of agility the squirrel seems to be quite indifferent as to the position of its head and often descends the trunks of trees with that important part of its body reversed.

In spring and summer I have often noticed the squirrels having fine fun among the trees, chasing each other up and down the pine trunks as if they were gone completely mad. The noise made by

their claws on the loose bark of the trees while thus engaged is very curious. This I conclude is the squirrel's manner of courting. The young squirrels to the number of three or four (and very funny little creatures they are too) make their appearance in the summer time, and are placed by their careful mamma in a nest of moss, dead leaves, and twigs, previously prepared for their accommodation, and situated high up among the thick boughs of the pine and the fir. In some counties, Hampshire for instance, the squirrel's nest is called a "drey."

The food of the squirrel is of a somewhat varied character. It is fond of nuts, acorns, walnuts, beechmast, &c. It will also nibble off larch shoots, and the buds and bark of other trees. At various times of the year numbers of pine and fir-cones may be found lying under the trees partly stripped of their scales. This is the work of the squirrel, which I have many a time seen with a cone in its grasp, which it adroitly stripped, biting off each scale neatly at the base for the sake of the seed nestling under the inner scale. The squirrel will also sometimes banquet on fungi, and a neighbour of mine once told me that it will rob rooks and pheasants nests, and that the olive-brown egg of the latter is a certain bait to catch a squirrel. Wood-pigeons and blackbirds nests are often harried by the squirrel, and it has been known to attack young and weakly rabbits. I cannot speak from personal knowledge of the carnivorous habits of this pretty little wood-dweller, but I have seen birds in a state of great agitation at the appearance of a squirrel in their neighbourhood.

The best time for observing the habits of the squirrel are the two autumn months, September and October. These to my thinking are the pleasantest months in the year, that is provided the weather is as it should be. How delightful to stroll through the woods at this time and to note the various interesting objects on every side! As you enter the wood you hear the sharp shrill cry of the kestrel, the laugh of the woodpecker, the crow of the pheasant, and the harsh chatter of the magpie. Then from yonder oak the beautiful jay takes its flight, uttering its loud alarm-cry. Through the fading ferns and dead leaves the brown rabbit presses its way, and an occasional weasel crosses the path. Those autumn flowers, the harebell and ragwort, bloom freely at the edge of the wood, and the rank fungi are springing up by the old tree stumps. The pleasant but indescribable smell of the autumn woods prevade the atmosphere, but an occasional puff of chilly wind tells that the year is fast getting into its "sere and yellow leaf."

Amid these pleasant woodland scenes the squirrel dwells, and is

now at the height of his enjoyment. You may see him now as he bounds aloft out of harm's way, and indulges himself in his curious chucking cry, as if he were jeering at the clumsy creatures beneath him. A pretty sight it is to see the squirrel feeding, sitting erect on end, with its bushy tail curled over its back, and using its fore-feet as hands, while it leers at you from its roguish looking eyes, and you have a picture of an animal whose whole life appears to be a continual round of merriment and pleasure. But it is not so, for the squirrel though gay and active has some sober habits of its own. One of these is to collect a store of food for its sustenance during the coming winter, and this is its time for working, for do not hazel and cob-nuts hang invitingly only to be gathered, and later on will not the chestnut, the beechnut, and the acorn strew the ground, and the wood-mouse, the vole, and the nuthatch come for their share, as well as the jay, the magpie, the wood-pigeons, and numbers of other birds and beasts. So our friend the squirrel is as busy as a bee. Its store houses are generally in hollow trees, and here quantities of acorns, nuts, and masts have been found snugly hidden away, but sometimes it will bury its nuts in the ground, each in a separate hole.

In winter the squirrel has a snug home to which to retire and snooze away, if he thinks proper, the frosty days and nights; he is only a partial hybernator, however. The winter nest is a much more substantial structure than the summer one, and is placed generally in the cleft or fork of a tree, or at the junction of a branch with the trunk. It is a mass of dry leaves, grass, and moss felted together.

The colour of the squirrel is usually of a reddish brown, but darker down the back and tail. The breast and belly is white. The colour of the upper parts varies considerably. In the winter, I have seen squirrels about this neighbourhood of a decided grey colour along the sides and tail. Sometimes the tail is almost white, and I once saw an individual with a nearly black head. A white one with brown ears used to frequent a wood a short distance away, in company with an ordinary coloured one.

Gossiping Notes on British Coleoptera.

By G. A. LEWCOCK.

I. SYNONYMY (*continued*).

Since the May issue of the *Young Naturalist* there has come under my notice the report of the committee appointed by the Netherlands

Entomological Society, "To inquire whether or not the Society ought to support the movement in the Entomological Nomenclature to change generic names hitherto in use, for older names or for quite new ones." The decision at which this committee arrived is certainly a great step towards settling the vexed question of nomenclature. "The committee is unanimously of opinion that the ever-swelling tide of synonymy must indeed be considered as a real calamity for science; that the nomenclature ought to possess the greatest possible degree of stability, in order to prevent confusion of genera and species; and that, therefore, *a priori, generally adopted names should not be changed without important reasons.*" The Committee further states "that the year 1751 ought to be taken as the commencement of the systematic literature," and adduces reasons for recommending this date.

That the Netherlands Society also unanimously approved the conclusions of the report is scarcely to be wondered at, and, judging from our own experience of entomological nomenclature, their action, I doubt not, will be hailed with delight by the practical entomologists of this country, who may now hope for a final settlement of the matter, more especially as the Society suggests that it could be brought under discussion at the Zoological Congress, which will be held this summer in Paris; and it only remains for our representative Societies to use their utmost endeavours to bring about so desirable a result.

II. THE BRITISH LIST.

A short time ago whilst turning over some old volumes of the *Intelligencer* and perusing the columns relating to correspondence, I came across a statement therein to this effect that "no complete list of the British coleoptera" existed at the commencement of 1858; but it is very evident that at this period considerable progress must have been made towards one, as during the following April Mr. G. R. Waterhouse published the first portion of his "Catalogue of British Coleoptera," containing the large groups Geodephaga, Hydradephaga, and Brachelytra; the remaining portion being duly presented to the entomological public later on. As this was the first attempt at anything of the kind, Mr. Waterhouse may be said to have cleared the way, laid the foundation, and collected the materials for those lists which since that time have succeeded each other with periodical regularity.

In May, 1861, a "Pocket Catalogue" was issued, also by the same author; this one, in point of fact, was revised and abridged from the larger edition, Mr. Waterhouse stating in his preface that "synonyms

were given only in cases where new species are added, or where any change is made in the name adopted in the first edition of my catalogue."

Compilers of entomological catalogues seem to enjoy somewhat lively times on completion of their labours, and the case of the author of the first British catalogue was no exception to the general rule, as he came in for a full share of adverse criticism, in the matter of nomenclature, from Mr. E. W. Janson, then Secretary of the "Entomological Society of London," who says (*Annual*, 1859, p. 118): "The facilities exclusively possessed by Mr. Waterhouse of leisurely and thoroughly investigating the collection of the late Mr. Stephens, purchased by the nation, and now deposited in the British Museum, warranted the expectation that on this score at least his catalogue would have afforded a complete epitome; and that taking Mr. Wollaston's 'Revision of the British Atomariæ'* as his model, he would have furnished such an analysis of the insects placed by the late Mr. Stephens in his cabinet to represent his published descriptions, as should guide us in forming a correct estimate of the value of those descriptions, and of arriving at a fair and impartial decision as to the extent to which the names employed by Mr. Stephens will rightfully supersede those in use on the continent. Until such an analysis is laid before the entomological public, any attempt to establish a uniform nomenclature must prove utterly abortive. It is not to be supposed that the entomologists of the continent will consent to the banishment of names 'familiar to them as household words,' and embalmed in the laborious and conscientious works of Gyllenhal, Erichson, Aubé, Schioedte, Schaum, Mannerheim, Chevrolat, Heer, Kraatz, Fairmaire, and a host of others too numerous to mention, unless full and unquestionable evidence is adduced of our right to substitute for them names equally cherished by us—precious legacies bequeathed to us in the writings of Kirby, Spence, Marsham, Leach, Stephens, Curtis, Westwood, Denny, Haliday, Wollaston, Walton, and luminaries of minor magnitude."

As might naturally be expected, Mr. Waterhouse took up the cudgels, and some spirited correspondence on the subject ensued between these two gentlemen in the pages of the *Intelligencer* (the only magazine then exclusively devoted to entomology). The following extract is taken from Mr. Waterhouse's letter (Jan. 22, 1859), and may, perhaps, throw some light on his position in respect to the com-

* Trans. Entom. Soc. Lond. New series, IV. 64 (1857.)

pilation of the catalogue: "When I first began this communication it was my intention to have entered into some detail respecting the plan which I have pursued in my endeavours to determine the Stephensian species (not specimens); they have of necessity varied much according to circumstances, for the matter is exceedingly complicated, but as it would occupy much space to enter into this detail . . . I must be content for the present in saying that I have done my very utmost to arrive at a just conclusion on the subject." At this point the editor closed the correspondence, with this remark: "Here the controversy must close, as we cannot afford space for a continuance of it."

Notwithstanding Mr. Janson's unfavourable criticism, the catalogue proved a literary success, and seems to have become the standard list of the day, indeed it was the only one. It was certainly recognised as such by Mr. E. C. Rye, who succeeded Mr. Janson as editor for coleoptera in *Annual*, 1863, he using it "as a base of operations, presuming that is now used by all coleopterists of repute"; and, as previously mentioned, is even now used by some few at least of the coleopterists of the present day.

In the latter part of 1863, Mr. G. R. Crotch published a "Catalogue of British Coleoptera," with the idea of establishing the continental system among us. The alterations made by Mr. South in the List of British Lepidoptera sink into the shade beside the radical changes here effected by Mr. Crotch in his list of coleoptera, as "in this catalogue it is the exception, and not the rule, for *any* species to remain unaltered, either in position, value, name, or parentage" (*Annual*, 1864). After setting forth many examples of the extensive alterations made by the author, Mr. Rye proceeds as follows:—"From these examples of the foreign ideas of classification which we are required to adopt, it may easily be believed (as indeed is the case) that a similar course of inversion, introduction, suppression, and elevation, has been adopted by Mr. Crotch throughout his catalogue, insomuch that there is scarcely anything left unchanged, and although credit is due to him for his invention to simplify the difficulties of conflicting nomenclature by endeavouring to place our system on the same footing as that of continental entomologists (who are nevertheless anything but unanimous on this point among themselves), yet I cannot refrain from observing that it is too evident that he wishes to depreciate English work; Marsham, Kirby, Stevens, and more recent authors being deposed in favour of foreign describers, with a very few exceptions, throughout the catalogue in question; and even when

thus treated, stigmatised by notes of interrogation being placed before the names of their species, as if it were impossible to determine the insects referred to by them from their descriptions and collections. I fear Mr. Crotch has simply altered the names in order to try and extinguish troublesome claimants for priority over his Teutonic favourites, and that he has not endeavoured to make out the species in question by the means at the disposal of every one willing to make use of them: had he done so he would not have had occasion to place queries before so many species, of which several are so easy to determine."

Furthermore, Mr. Rye gives a list of eleven species, some of which are considered even now, to say the very least, as "not uncommon," that "surely ought to have had a place as British." The first of these, *Otiorhynchus sulcatus*, as is well known to gardeners in North London, is generally a very common beetle, but, like other things, those who want it must search properly to find it. *Adimonia sanguinea*, also included in the number, may likewise be termed "common,"—and most of the others are equally well known to us.

From the foregoing, it will be seen that the reception accorded to Mr. Crotch's catalogue cannot be termed flattering, Mr. Rye being as much opposed to continental nomenclature as Mr. Janson was in favour of it. Yet in a succeeding volume of the *Annual*, Mr. Rye rather seemed to recant his former opinion, and acknowledges that "the extension of acquaintance with continental opinions" arose "chiefly from the energy of Mr. G. R. Crotch."

In 1866, Mr. Rye brought out a useful little work as an introduction to the study of British beetles, which he states was intended rather as a "delectus" than a hand-book; and appended thereto is a list, consisting "mainly of Mr. Waterhouse's catalogue, with some few alterations in position, and the addition of the species discovered since the publication of the latter." Towards the end of the same year, Mr. Crotch, who had acquired the large collections of Messrs. Wollaston, Janson, and others, brought out a "second edition of his Catalogue of British Coleoptera, accompanied by verification of most of his additions in 'Newman's Entomologist' and in a paper communicated to the Entomological Society." There were considerable additions to the new species in this list, the number for 1866 alone reaching the high figure of 123 "new to this country," and 19 "species new to science," although of the former number Mr. Rye thinks "that the odd 23 or thereabouts must be considered as somewhat doubtful." The catalogue, as formerly, was based on the re-

cognised continental classification, and contained many changes of generic and other names. The species are numbered throughout; but Mr. Rye complains of "the entire omission in the great majority of instances, and the extreme abbreviations in others, of the authors of species, which cannot fail to militate severely against its usefulness." He also thinks that "after a time species new to us will much less frequently occur, and our attention must be directed to *synonymic matters*. As it is, thanks mainly to Mr. Crotch's exertions, *we have rather more of these latter than is required at the present juncture.*"

The Buckler Collection.

We have always held a very strong opinion that the Buckler collection ought to be the property of the Nation. Its value consists, not in the rarity of the species contained in it, nor because numerous fine varieties are included; both these advantages may appertain to it, but it has an exceptional value far above these, that belongs to no other collection in the world. For a quarter of a century the late William Buckler devoted himself to figuring, and latterly to describing the larvæ of British Lepidoptera. Being a miniature painter by profession he was eminently qualified for the work he had undertaken. These figures are now being published by the Ray Society, and as the collection contains the identical specimens reared from the larvæ so figured, the figures and collection combined may always be referred to with authority as being British.

This collection was left by will to Robert Newbury, Esq., Manor Lodge, Feltham, Middlesex, with whose brother Mr. Buckler had lived for many years, at Lumley Mills, Emsworth. This gentleman recently offered to present the entire collection to the British Museum, and the proposed gift has now been accepted, as the following letter shows:—

British Museum (Natural History),

Cromwell Road, London, S.W.,

April 2nd, 1889.

Dear Sir,—I had the pleasure of laying before the Trustees of the British Museum, at their last meeting here, a report by Dr. Günther of your gift to the Museum of the very valuable collection of British Lepidoptera formed by the late Mr. William Buckler.

The Collection was submitted for the inspection of the Trustees, and they were informed that it consists of more than 6000 well-preserved specimens, all named, and including a great number of rare varieties; and that you were also good enough to present the cabinet in which the collection is contained.

In accepting your valuable donation, the Trustees directed me to convey to you the expression of their special thanks for your liberality, which has enabled them to make a very important addition to the National collection of British Lepidoptera.

I have the honour to be, Sir,

Your obedient Servant,

W. H. FLOWER.

R. NEWBURY, Esq.

We have only to express our hope that the collection, being so important for the reasons given above, will be kept intact, and not mixed with other specimens. The cabinet being presented along with the contents makes this very easy of accomplishment.

We are sure the best thanks of every lepidopterist will be heartily given to Mr. Newbury for thus placing so important and typical a collection where it will be accessible to every one.

An account of many of the insects contained in the collection will be found in the seventh volume of the *Young Naturalist*.

Anal Appendages.

By C. A. BRIGGS.

It is satisfactory to find that Mr. Pierce examined a sufficient numbers of specimens of each species to ascertain beyond doubt, that there is no variation in the appearance of the anal appendages of each species, so far as typical specimens are concerned.

He seems, however, to have so utterly mistaken two of my queries that he has practically replied to questions I never put.

I never asked whether pairing could alter actual structure, such, for instance, as the number of hooks on the organ, but only whether it could alter *appearance*. Considering how largely his paper dealt with appearance, and that in his descriptions he uses such words as "shorter," "stouter," "slender," "produced beyond the flap," &c., I do not see that my question was so unnecessary. To most of us the whole matter is novel, and it is certainly desirable to have it explained clearly, and it might well have been that actual use might have developed or altered the appearance of these organs.

Then again, as to his remarks on "age." I am sorry to have to explain to him that I was not referring to the duration of the imago, but to the time that had elapsed since the specimen was alive. The expressions, "old specimens," "the age of a specimen," &c., are so

universally understood that I am surprised at Mr. Pierce's singular mistake.

With regard to the lengthy remarks he makes on my statement, that the whole of our *Zygænidæ* are well known in all their stages, I would merely point out that it was made in answer to his strange assertion that very little was known of their earlier stages. Will he now give us the names of those species which he considers are not known?

Then again, with regard to the British *Zygænidæ* as a class. Most entomologists will agree with me that there is no difficulty in recognising the typical specimens of each species, but that the difficulties only arise when we have to determine to which species aberrant forms belong. How Mr. Pierce proposes in these cases to determine the species while ignoring the individuals does not as yet appear clear, but it is to be hoped that he will extend his observations to some of these singular forms of our *Zygænidæ*, which are frequently though probably erroneously called hybrids.

I regret to see that Mr. Pierce seems to think that I was depreciating the value of his observations; on the contrary, although thinking that the *Zygænidæ* are a group that present peculiar difficulties from their apparently unsettled characteristics, I trust that he will pursue such useful investigations on a matter comparatively little known.

55, *Lincoln Inn Fields*, 19th May, 1889.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

May 1st, 1889.—Mr. F. DU CANE GODMAN, M.A., F.R.S., Vice-President, in the chair. Mr. Walter F. H. Blandford, B.A., of Trinity College, Cambridge, and 48, Wimpole Street, W., and Mr. John W. Downing, of 59, Lupus Street, St. George's Square, S.W., were elected Fellows; and Dr. Neville Manders and Mr. Arthur Cant were admitted into the Society.

Mr. W. L. Distant announced the death of Dr. Signoret, of Paris, one of the Honorary Fellows of the Society.

Dr. Sharp exhibited male and female specimens of an abnormal form of *Rhombo-rhina japonica*, found in Japan, by Mr. G. Lewis. They exhibited a contraction of the thorax, which was much narrower than usual at the base, so that the mesothoracic epimera were entirely exposed. Dr. Sharp also exhibited a small collection of Coleoptera, made by Dr. N. Manders, in the Shan states, Upper Burmah; this collection contained several new interesting forms, the most remarkable being a small Heteromorous insect bearing a considerable resemblance to *Rhysodes*. Amongst

the specimens was an example of *Batocera roylei*, which Dr. Sharp had retained in a relaxed condition, so that the Fellows might have an opportunity of hearing its stridulation; this was produced in a very audible manner by the base of the prothorax passing backwards and forwards over a striated space at the base of the scutellum.

Mr. C. O. Waterhouse exhibited, for Mr. Frohawk, a series of wings of British butterflies, prepared in accordance with a process (described by Mr. Waterhouse in the Proc. Ent. Soc. 1887, p. xxiii), by which they were denuded of their scales so as to expose the neurulation.

Dr. P. B. Mason exhibited cocoons of a species of spider (*Theridion pallens*, Black.), from Cannock Chase, distinguished by the presence of large blunt processes on their surface.

Mr. H. Goss exhibited, for Mr. N. F. Dobrée, a number of scales of *Coccidæ*, picked off trees of *Acacia melanoxylon* and *Grevillea robusta*, growing in the Market Square, Natal. These scales had been referred to Mr. J. W. Douglas, who expressed an opinion that they belonged to the family *Brachyscelidæ*, and probably to the genus *Brachyscelis*, Schrader. He said that most of the species lived on *Eucalyptus*.

Capt. H. J. Elwes exhibited a long and varied series of specimens of *Terias hecabe*. He remarked that all the specimens which had strongly defined chocolate markings were taken in the cold and dry season, and that those which were without, or almost without, markings, were taken in the hot and wet season. Capt. Elwes further observed that he believed that many species which had been described as distinct were merely seasonal forms of this variable species. Mr. W. L. Distant, Mr. F. D. Godman, Prof. Meldola, Mr. H. T. Stainton, and Mr. G. Lewis took part in the discussion which ensued.

Mr. W. Dannatt exhibited specimens of *Thaumantis Howqua*, West, from Shanghai.

Mr. H. Burns exhibited, and made remarks on, a number of nests of living ants of the following species, viz., *Formica fusca*, *Lasius alienus*, *L. flavus*, *L. niger*, *Myrmica ruginodis*, *M. scabrinodis*, &c. One of the nests contained a queen of *L. flavus*, which had been in the exhibitor's possession since September, 1882.

Mr. G. C. Bignell communicated a paper entitled "Description of a new species of British *Ichneumonidæ*."

Mr. A. G. Butler communicated a paper entitled "A few words in reply to Mr. Elwes' statements respecting the incorporation of the Zeller Collection with the with the General Collection of Lepidoptera in the Natural History Museum." Capt. Elwes, Mr. Stainton, Mr. Godman and others took part in the discussion which ensued.—H. Goss and W. W. FOWLER, Joint Hon. Secs.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

April 18th, 1889.—Mr. HUCKETT, Vice-President, in the chair. Mr. Bellamy exhibited a variable series of *A. badiata*. Mr. Clark, a series of *C. suffumata*, bred from ova received from Forbes, and stated that he had observed no variation in the specimens from the Southern form of this insect. Mr. Lusby, a large number of

larvæ of *C. villica*. Mr. Hanes, larvæ of *N. augur*, *triangulum*, &c., also a series of *H. leucophearia*, and remarked upon the scarcity of this species at Richmond during spring; Mr. Boden also spoke on the subject, and stated that he had observed an unusual number of crippled specimens of this insect.

May 2nd, 1889.—Mr. J. A. CLARK in the chair. Mr. Clark, on behalf of the Rev. G. Jones, exhibited two specimens of Queen Ant and also workers, the species being from South Africa, and gave a short account of the life-history and habits of the insect. Mr. Hanes, series of *B. parthenias*, *C. flavicornis*, *A. badiata*, &c., also larvæ of *N. baja* and *festiva*. In Coleoptera, Mr. Battley exhibited specimens of *Barynotus obscurus*, taken by him at Hackney marshes. Mr. Hanes, a specimen of *Meloe proscarabeus*. Messrs. Jarvis and Lewcock, a quantity of Carabidæ from Rainham, Essex, including *Pterostichus vernalis*, *P. inæqualis*, *Bembidii*, and *Anchomenus atratus*; also a large number of aquatic species from Epping Forest, amongst which were two *Hydrous caraboides*, *Ilybius ater*, &c.; likewise eight species of Hemiptera from the same locality. Mr. Milton's box contained a variety of Coleoptera. Several members gave accounts of work done during Easter at salallows; in some localities such species as *T. rubricosa* and *T. gracilis* were unusually abundant. It also appeared that other orders of insects were on the move, and coleoptera especially plentiful.—EDMUND HANES and G. A. LEWCOCK, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

25th April, 1889.—T. R. Billups, Esq., F.E.S., President, in the chair. Messrs. W. Cant, of Regent's Park, and R. Fortune, of Harrogate, were elected members. Mr. Cooper exhibited a series of *Taniocampa populeti*, bred from a specimen said to have been taken at Rannoch. Mr. Tugwell said the specimens did not differ from the southern form of the species, and Mr. Carrington remarked that the same form was taken in Yorkshire. Mr. Adye showed a long series of *Cymatophora videns*, from the New Forest. Mr. Fremlin, varieties of *Vanessa urticae*, picked from 3,500 specimens bred by him last season; in some of the specimens the variation was in the shade of colour of the wings, in others in the size of the two spots on the superior wings, and in the duplication of the spots, and many in the absence of the pigment. These last, Mr. Fremlin said, emerged with crumpled wings, and died within a few hours of doing so. There were also several varieties of *Vanessa io* in Mr. Fremlin's exhibit. Mr. W. West (Greenwich) exhibited the specimen of *Carpocapsa pomonella*, referred to in Mr. Cockerell's note read at the previous meeting. Mr. T. R. Billups, a large number of British spiders mounted on card, and he stated that he had very little difficulty in preserving them in this way. Mr. Wilkinson, an example of *Nephula maurata*, from the Seychelle Islands, but expressed some doubt as to whether the insect was properly named. Mr. Rice, varieties of the egg of the blackbird, and a living example of *Pelias berus* from Leith Hill. Mr. Carrington contributed a paper on "British Spiders" which was followed by a discussion.

May 9th, 1889.—The President in the chair. Mr. Tugwell exhibited *Tephrosia*

biundularia, showing marked variation, including a banded male, all bred from a specimen taken at Tilgate Forest, May, 1888; also bred series of *T. crepuscularia*, spring and summer broods, from the same locality. Mr. Adye, a light form of *Catocala promissa*, the dark bands in the hind-wings being very indistinct. Mr. Moore, two larvæ of a species of *Sphinx*, from the West Indies. Mr. Adkin, a short series of *Nyssia hispidaria*, from the New Forest. Mr. Watson also exhibited *N. hispidaria*, from West Wickham. Mr. South exhibited a long series of *Noctua brunnea*, and *dahlia*, *N. festiva*, and var. *conflua*, from various localities. Mr. South remarked that in 1886 and 1887, he obtained large numbers of the larvæ of *N. brunnea*, from North Devon; which were found feeding on bilberry and a species of wood-rush. Although the larvæ differed in colour very considerably, yet, they were very constant in the markings: he then at some length pointed out the different forms of variation of *brunnea* in his exhibit, and that in some cases *brunnea* so closely approached *dahlia* that he had a difficulty in saying which was which, and he was of opinion that the relationship between *brunnea* and *dahlia* was the same as that between *festiva* and *conflua*. Mr. Tutt also exhibited two drawers from his collection containing the species referred to, and Mr. Adkin, *N. brunnea* and *N. dahlia*, from Sligo, Kent, and other localities. A discussion ensued, Messrs. Tutt, Adkin, Tugwell, Carrington, and others taking part. Mr. Billups exhibited a series of *Bembidium testaceum*, from Chobham, living specimens of *Carabus auratus*, captured in the borough market, and a species of Oribatidæ, which he stated was causing an immense amount of mischief to corn chandlers by feeding on the crushed oats. Some interesting ornithological notes were contributed by the members.—H. W. BARKER, Hon. Sec.

Last Year's *D. Galii*.

By. C. A. BRIGGS.

That British captured specimens of *D. galii* are larger than British bred ones has, I think, been a matter of common notoriety for many years past, but that this is evidence of immigration is a very different thing. Mr. Tugwell in his recent remarks seems to have left continental bred specimens out of his calculations altogether, but before his theory could be even ripe for discussion, it would be necessary to fill in the missing link in his paper, by the production of sufficient data of the result of the comparison of British bred specimens with continental bred specimens, taking care that the continental specimens came from that part of the continent from which he considers the "blown over" specimens came. I mention this as the "blown over" theorists are usually very vague, perhaps wisely and intentionally so, but it would greatly assist us if in referring to "the continent," they would but to some extent indicate the portion of the continent to

which they refer, so that for instance in this case enquiries might be made in the district from which Mr. Tugwell thinks our *galii* came, to ascertain whether or not *D. galii* was unusually common there last year, or whether it is double brooded there. It is as easy to say on the unexpected appearance of an insect that it is blown over from somewhere or other, as it is difficult to disprove or believe it. These periodical appearances are in our present state of knowledge so mysterious and so inexplicable, that to ascribe all to a vague "blown-over" theory seems but a faint-hearted way of shelving a difficulty, which should rather be approached in the careful and thoughtful manner in which it was treated by Mr. W. E. Sharp, in the last number of the *Young Naturalist*.

53, *Lincoln's Inn Fields*, 25th May, 1889.

Notes and Observations.

CHRYSIDA IGNITA.—"Will you kindly name the enclosed fly, I saw several in July last resting on a sandbank, the colours were so beautiful that I could not resist the temptation of boxing one. If of any service to you, please retain it?—W. U'LAN."

The insect is *Chrysis ignita*, as you truly observe, it is a very lovely insect, with its beautiful metallic colours, head and thorax blue-green, often with a dash of gold; the abdomen coppery-carmine. Curtis says, "nothing can exceed the splendour and brilliancy of the *Chrysididæ*, which have been compared by Latreille to precious stones, and very aptly called by Jurine the humming-birds of entomologists. It must be confessed that nature has been lavish in adorning them with such beautiful and effulgent colours, that our astonishment and admiration are equally awakened on contemplating them. Latreille supposes this splendour may dazzle their enemies and so facilitate their escape." This insect varies much in size, varying from three to seven lines in length, also in the metallic lustre of the colours. The apical margin of the abdomen is terminated generally by four spikes, some longer than others and sometimes almost wanting, the earlier authors dividing them into species, according to the length and arrangement of the spikes, consequently there are some half-dozen names for this variable creature. When captured they roll themselves into a ball; the thorax and abdomen is wonderfully hard and it is with great difficulty you can pass a pin through it. This insect is a parasite on wasps and bees; I have bred it from *Odynerus pictus*, the

larva, like the majority of hymenoptera do not change to pupa until about a fortnight before the perfect insect appears.—G. C. BIGNELL, Plymouth.

NYSSIA HISPIDARIA.—A new locality for this insect we discovered in Surrey woods. Three fine males found low down on oak trees. This species occurs now in Richmond Park, Epping Forest at Chingford, and would be probably found in other directions near London, if looked for at the right time, although the well-known habitat of Richmond is well worked and still yields the most specimens.

CREPUSCULARIA.—We met with four specimens on March 31st, in the Surrey woods, a few others on April 4th, April 7th, and four on April 11th, although this, we were told is "a month too late for *Crepuscularia*."—J. HENDERSON and C. H. WATSON, London.

EARLY NESTING.—On p. 107 of the *Young Naturalist*, Mr. D. H. Stewart, Oxford, speaks of a nutcracker's nest with eggs having been found by a friend of his on March 30th. Might I venture to ask Mr. Stewart what bird is here meant? The nutcracker (*N. caryocatactes*) is a very rare visitor to this country. Probably the nuthatch (*S. europæa*) is intended; if so, the date is most certainly very early.—W. H. WARNER, Fyfield, Abingdon.

DIANOUS CÆRULESCENS.—I was very pleased to turn up this species somewhat abundantly at Eggleston, in Teesdale, at Easter, it occurred under stones beneath a small waterfall, very rarely among the moss, which is generally given as its hiding-place.—JOHN GARDNER.

BRYOPORUS HARDYII.—I took a specimen of this rare beetle upon the sandhills here on April 27th.—JOHN GARDNER, Hartlepool.

SPRING NOTES.—*April 21st, and hardly a lepidopteron seen by me this year.* Jan. 31st.—Went to Morton and Bidston Hill larvæ hunting; driven under cover by a rain storm—nothing seen. Feb. 21st.—Went to Eastham Wood; never saw a moth. Feb. 22nd.—Went to Formby to survey the *Euphorbia pyralis*. Walked through hundreds of thousands of plants growing thickly on blown sand for quite a mile in length; the flower stems still retaining the form of the old flowers quite freshly. Formerly, odd plants of this interesting plant used to grow on the sandhills up to Sandhills Bridge, then close to Liverpool, through Bootle and Waterloo to Crosby and Hightown; now these sandhills grow nothing but houses until we got beyond Crosby. In a prospecting journey last year I did not find a plant of the *Euphorbia* at the Liverpool side of Hightown, but as stated above it covers large

tracks of land—no, sand still—about ten miles from Liverpool, growing most luxuriantly; I counted some tufts having over one hundred fresh young spikelets springing up for this year's crop of flowers. March 15th.—To Formby larvæ hunting. Plenty of *green* larva of *E. lichenea* and various common species; but did not take any, preferring to let them feed up at their home rather than at mine. April 9th.—Formby, larvæ of *lichenea* hardly grown at all; still *green*. April 10th.—To Wallasey with Dr. Ellis, searching for eggs of *T. opima*: no *opima* out yet. April 20th.—Again at Wallasey sandhills after *opima* eggs. I smoked for the moth, but never saw one. It seems to me that the season is out of joint, nothing out of doors this year as far as I have seen has come to time. The continual cold winds, and the absence of sunshine, has kept vegetation back more than I ever remember in my long life. I do not remember ever writing of my non-success before, but I may say that up to now I have not seen a moth outside, this year. What our last year's *galii* collectors will say about the hills they so affected when they turn out for more *galii* larvæ next season I cannot conceive, for the sand has moved on to almost every favourable place they worked amongst the *Galium verum* beds, and these places are now great stretches of little sandhills or bare sand.—C. S. GREGSON, Rose bank, April 21st, 1889.

ERRATA.—Page 81, line 30, for "Stroud" read "Strood"; line 33, for "oak" read "ash." Page 82, line 34, for "feed" read "fine."

On the Wings of Insects.

By CHAS. H. H. WALKER.

(Continued from page 96.)

A very peculiar aberration from the ordinary type of wing is found among the family *Proctotepidæ*, as in *Mymar pulchellus* (West. vol. II., p. 172), where the anterior pair consist each of a long, thin filament, flattened at the extremity or "spatulate," the margin being densely fringed. The hind wings are almost obsolete, appearing only as two short, slender hairs.

The females of many species of Hymenoptera are wingless or apterous, while many, such as the ants, bite or snap them off after they have served the only purpose for which they were created.

It must not be thought that wing hooks, though so eminently characteristic of Hymenoptera, are peculiar to that important division of the insect kingdom, for in our next order, the *Homoptera*, family *Aphidæ*, or plant lice, a similar arrangement exists for the connection of the wing. In these insects, which are only too familiar to gardeners and agriculturists generally, the organs of flight are carried in a very different manner to those of the orders already considered, being gently deflexed or sloping like the roof of a house, and meeting at a very acute angle over the back. The stigma is still present, that is to say, in cases where the individuals have wings at all, it being no uncommon thing to find them entirely absent.

As a general rule, the wing hooks are arranged in a bunch and are usually seven in number. Fig. 8 shows a highly magnified representation of the same as found on the wings of *Schizoneura corni*, and it will be at once seen that they do not spring from a nervure, but from the membrane itself, at which point the two layers probably unite and become thickened, so as to



Fig. 8.

afford sufficient support. The hooks very closely resemble the pot-hooks and hangers that marked our early initiation into the art and mysteries of script, the recurved ends permitting every degree of freedom when the attachment is made by means of the lip provided for their reception. Nothing is wanting in these simple but wonderfully effective structures: the mere act of opening the wings—passing the anterior forward by a sliding motion over the posterior—completes the unity of the two members.

Many of the exotic species of *Homoptera* are remarkable for the extraordinary form taken by them, the thorax being prolonged over the abdomen, and furnished with strange branchiate excrescences.

A characteristic of the wings of most insects is the hairs or spines with which the membranes are so plentifully besprinkled. They are found of all degrees of length, and a single wing oftentimes exhibits them in every gradation. Their bases are fixed in depressions in both upper and under surfaces, a perfect ball and socket joint being formed in many instances. They likewise undergo many curious modifications, and are represented in the *Aphidæ* by pyramidal elevations of both superficies. In most *Diptera*, a single hair springs from the centre of each of the hexagonal areolæ, to which reference has already been made. They may, with some degree of truth, be said to have their representatives upon the wings of moths and butterflies, in the more highly developed form of scales, but are now so altered in out-

line and structure, that nearly all resemblance is lost. These scales exist in immense numbers on both upper and underside of the wing, and are usually readily detachable, the merest touch sufficing to remove them in quantity as a fine, slippery dust.

The wings of lepidoptera are sometimes split or divided, as in the *Pterophori*, or plume moths, but these rays or feathers all branch from the same root. The females of some species are apterous, without wings, others possess these appendages in a rudimentary form, and as such, unfit for flight, while one species, *Lobophora hexaptera* is the fortunate possessor of six, four true wings, and two smaller ones or winglets.

The hind-wings of butterflies and plume moths are not folded, but perfectly flat and rigid, while those of the moths are folded longitudinally—that is to say, from the base to hinder-margin, and concealed by the upper-wings during repose.

Many species can easily be distinguished while on the wing, by their peculiar and characteristic flight. In the *Hymenoptera* and *Aphidæ*, we noticed that the wings are held together by a series of hooks, and a similar arrangement is found to exist in the lepidoptera, never, as far as I can discover, among the butterflies, but frequently among the moths.

The costal margin (see Fig. 9, representing the *underside* of *Acherontia atropos*) at a short distance from the insertion of the wing, is furnished with a large and well developed loop, apparently formed by an extension of the walls of the nervure. This is covered with hairs or scales, and sometimes seems to consist of incurved hairs alone. Attached to the root of the under wing on the same side is a strong curved bristle, longitudinally striated, passing through the loop on the upper wing,

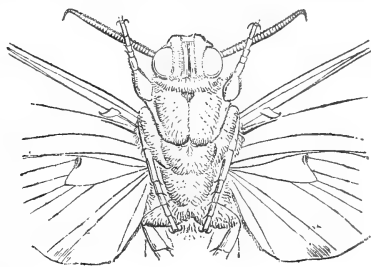


Fig. 9.

and locking the two members together, we chiefly find them in swift-flying moths, but only in a complete form in the males, though the opposite sex not unfrequently have the number of bristles multiplied, but possess no loop on the upper wing. They are very apparent in the males of the Sphingidæ—*A. atropos*, *S. ligustri*, *D. euphorbiæ* and *galii*, *C. elpenor*, *M. stellatarum* and others being well provided, the other sex lacking both hook and bristle. A curious exception seems to occur in *S. ocellatus*, for in neither sex could I discover the slightest trace of either.

The colouring is liable to extreme variation, individuals of the same species being anything but constant in their markings. Nature has lavished her choicest favours upon some, and particularly many exotics, while others are more soberly clad, nor is the colouring of the upperside often re-produced upon the upper surface, others again bear a most startling resemblance to withered leaves when at rest, with midrib and stalk complete. Specimens with transparent patches on the wings, quite denuded of scales, are not at all uncommon; the Clearwings for example: others are semi-transparent, such as *Procris statices*, *Setina irvorella*, and *Arctia fuliginosa*, owing to the covering of scales being thinner. *Liparis salicis*, contrary to what one would expect from its lovely satiny texture, possesses a meagre sprinkling of scales, but the membrane is covered with minute creases.

Another curious feature consists in the tail-like appendages to the hind-wings of many exotic species, *Tropea leto* and *T. mimosa* for example; our own *Papilio machaon* is well known from this peculiarity.

Pass we now on to the colouring of the wings, which is found to be entirely due to the scaly coating, for when this is removed by rubbing, the perfectly colourless membrane is left exposed, and the beauty of the insect is gone for ever. The assistance of the microscope is required to show the immense variation displayed by these scales, both as regards eccentricity of contour and peculiarities of structure. Their number is exceedingly great, in fact beyond accurate conception, though Leuwenhoeck has estimated there to be four hundred thousand of these atoms on the wings of the silkworm moth. They are furnished with a base or peduncle, which is received in a similar cavity in the wing membrane, and their method of arrangement reminds one very much of the slates covering the roof of a house, one row partly overlying that immediately below it.

From the fact that damaged scales are frequently met with, it has been ascertained that they consist of two, but more often of three layers of membrane, and it is upon the outer layers that the minute granulations composing the colouring matter of the scale are found. These in the white scale of *Doritis apollo* (Fig. 11) are very numerous and crowded together, and apparently but air chambers, thus rendering the passage of transmitted light laboured and uncertain. Hence they appear black in the illuminated field of the microscope. Most of this air can be expelled by oil of cloves,

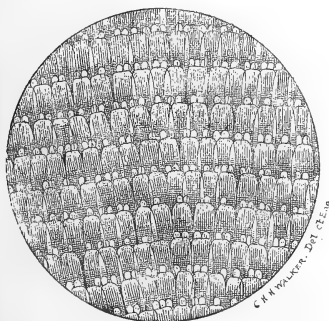


Fig. 10.

and the scale is then seen to be composed of longitudinal striæ; each line formed by the cohesion of the granular particles. In the scales of *Lycæna corydon*, the granular nature of the striæ is very evident, while in the peculiar battledoor scale, so well-known as typical of the "blues," the striæ are not only few in number, but are interrupted at regular intervals by expansions or enlarged granules (Fig. 12.) Another point not shown in the figure, concerning these so-called "battledoor scales" is that the striæ are in many cases very imperfect: in fact, more apparent than real. The dilatations are present but unconnected. I have only been able to see this with an immersion lens of high power, the best eighth objective being incapable of separating them. This is largely due to the fact that low powers practically focuss both upper and lower membranes, and as the markings are common to both



Fig 12.



Fig. 14.

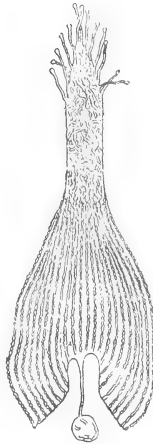


Fig. 13.

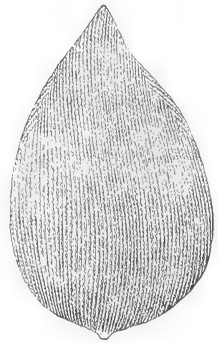


Fig. 11.

C. H. H. P. W. C. O. C. C. C. C.

laminæ, an incorrect image is the result. This remarkable scale is only found on the male insect, never, as far as I am aware, on the female; and, moreover, only on the upperside.

Reference to Fig. 10. (*L. adonis*) will show the position occupied by them on the wing, and it will be noticed that an irregular row alternates with the ordinary scales, which cover their long peduncles, leaving only a portion of the spatulate enlargement visible. This scale varies in contour somewhat, according to the species bearing it. Thus in *L. corydon* (Fig. 12), we have an almost perfect oval, with an elongated stalk, becoming rounder in *L. arion*, with the accompaniment of an abbreviated pedicle. Those of *L. alexis* and *L. argiolus* are cut off almost square at the tips. A most curious exception occurs in *L.*

agestis. This species, which resembles the *Lycænida* in its transformations, is quite destitute of the characteristic "battledoor" scales.

The males of many butterflies have scales peculiar to the sex; thus the tufted scales of *Satyrus megæra*, *Anthocharis cardamines*, *Pieris napi*, *P. rapæ* (Fig. 13), *P. cratægi* and *Argynnis paphia*, characterize the one sex only. But not only has the upperside of the wings the exclusive possession of certain peculiarly formed scales, but the underside likewise lays claim, in many instances, to sole right of ownership. A single example will suffice, that being the pretty little Green Hairstreak butterfly (*Thecla rubi*.) Mingled with the ordinary typical form will be found a numerous sprinkling of rudder-like scales, which look exactly as though a good third part had been cut off them, leaving the remaining two-thirds with the usual peduncle and its axial continuation at one side. Fig. 14, which represents this scale as viewed with a quarter inch objective, does not show the granulations composing the parallel striæ: a higher power lens is necessary to bring out these markings with clearness.

It is the middle layer of membrane that originates the brilliance of colour emitted by many scales, and its reflective power is only minimised by a preponderance of dark colouring granules in the outer laminæ. Perfectly colourless scales give to the wing of an insect a metallic lustre, and in such instances, *Plusia chrysitis* and *P. festuæ* for example, two striated layers only are present. White scales, however, as I have already had occasion to observe, owe their appearance to colourless granulations, which act upon rays of light much in the same manner as pulverized glass.

As we approach the marginal fringes of the wings, the scales become more and more elongated, while the dentations upon the free ends increase in size in a corresponding ratio. Even the transition of scales to hairs becomes easy and natural.

The *Trichoptera*, which includes the well-known caddice flies, needs but small comment. Their wings are ample and well-developed, sometimes very thickly clothed with hair, the posterior pair being longitudinally folded when the insect is at rest. Yet, notwithstanding the large expanse of wing, the caddice flies are nevertheless clumsy flyers, but as they chiefly pass their life in a limited locality, we would not be led to expect exceptional powers of flight. Moreover, from the extremely rudimental formation of the mouth, it is probable that the procuration of nourishment is rendered unnecessary, and long foraging excursions therefore needless.

The *Thysanoptera* embrace a curious group of insects of very minute size, such as the *Thripidæ*, which occur in great abundance on the flowers of many plants. The wings are microscopic objects of great beauty, are exceedingly transparent, and very narrow in proportion to their great length. They are, in *Thrips cerealium* (sp.?), covered with very short hairs; and, in addition, the anterior pair have a couple of longitudinal rows of stiffer and more bristle-like processes, one series of which suffers a marked interruption or break. The posterior wings appear to have a trace of a median nervure, while the outside margins of all four are densely fringed. It is a circumstance of no uncommon occurrence to find apterous females in the different orders, but an exception occurs in that now before us, for it is the males of some species that are found wanting. Mr. Haliday mentions the transformation of the fore-wings into neurated elytra in others. These insects form a highly interesting group, and ought to be great favourites with microscopists. The organs of oviposition in the female are strikingly like those of the *Tenthredinidæ*, with a pair of formidable saws: the antennæ are likewise worthy of minute examination, each joint being furnished with a pair of digital processes.

Pass we now on to our second division, which includes the *Orthoptera* only, an order containing many familiar insects, including cockroaches, locusts, crickets, and others. Their upper wings, to which is given the name *Tegminæ*, partake of a few of the characteristics of the hinder pair, being of a nature like unto parchment, rigid, covered with reticulations, and, when laid at rest, the inner portion of one overlaps the corresponding portion of the other. But then this is not an unvarying feature of the order, such not being the case in *Mantis*, *Mantispa*, some female *Acridæ*, *Gryllus*, and *Gryllotalpa*. The tegmina are nevertheless used in flight. The larva and pupa are like the perfect insect, except in the matter of wings, which, though rudimentally present, do not become of any real service until the final change. The posterior wings are folded longitudinally like a fan, down the back of the insect, except in *Blatta* and *Phasma*, where the anterior surface is somewhat thicker and lies flat, the remaining portion folding under, along the radiating creases formed by the principal nerve branches. In fact, the representatives of the order present a maze of exceptions, and any attempt to compare them by analogy would be hopelessly futile. Thus we find the posterior wings absent, or present to the almost entire exclusion of the upper pair, and though the anterior appendages are represented in all orders, yet a solitary exception occurs in an individual of this group, *Aschiphasma hieroglyphica*, in

which there is not a vestige of the front pair, nor are they degenerated by any mesothoracic attachment (Westwood.)

The production of sound by insects has ever been a fruitful theme for controversy and speculation, and we must not expect to find it evolved by any of those methods with which we are familiar. We are accustomed to associate sound—voice, I may say—caused by living creatures with the passage of a current of air over certain flexible cords during breathing; but among the insects we must be prepared to find very different modes of producing sounds, not unfrequently of high musical pretensions. The *Orthoptera* are notorious musicians, but the province of the present paper confines me to one group, viz., the *Achetidæ*, or crickets. The house and the field cricket, respectively *Acheta domestica* and *Gryllus campestris*, are known in particular for the sound they produce, a kind of clear chirrup, which can be heard a considerable distance. Only the males of both species possess vocal organs, which they use with much force and vigour, chirruping not only by day but also by night.

I have given, at Fig. 15, a detailed drawing of the left wing-cover or tegminus of the male House Cricket, the unique pattern of the neururation at once leading us to suppose that some very important office is fulfilled by this important organ. The right and left wing covers resemble each other in all points but one, to which I shall

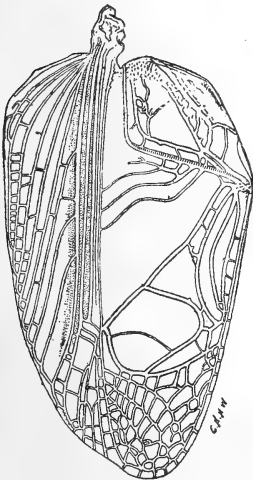


Fig. 15.

presently have occasion to minutely refer. We first notice that the tegmina consist of two portions, divided by a parallel series of four nervures, the lesser (or third part) being deflexed, and covering the sides of the abdomen, the remainder constituting a dorsal protection, and lying flat. It is on this latter portion that the stridulatory organ is placed, occupying the greater part of a basal nerve that is bent to almost a right angle. The peculiar structure of this nervure, however, only becomes apparent under a higher magnification, and is shown at Fig. 16. It will be seen that this branch is bridged over by a number of parallel, elevated ridges, not bending round the curve of the nervure, but so raised, or built up against it, as to

form, *en masse*, by their exposed edges, one horizontal plane. This serration, if I may so term it, is peculiar in the case of the left wing-

cover to the underside of the nervure, but is seated upon the upper-side of the corresponding nerve of the right tegminus, which underlies the left when laid at rest. By observation,

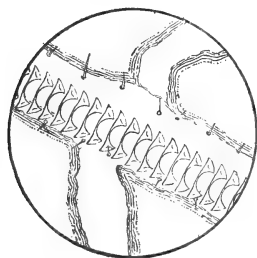


Fig. 16.

it will be found that the two nervures are then superimposed, and a rapid combination movement of the wing covers, produced by a lateral to and fro vibration, has the effect of rasping the one set of ridges over the other, thus producing a shrill whistle. It is only natural to expect that the resultant sound will be weak and almost inaudible, but the intensity is increased by the communication of the vibrating waves to the surrounding membrane, which is admirably adapted to receive and magnify such impressions. The large cells into which a great portion of the wing covers is divided, will all unite their individual vibration to swell the volume of the sound.

(To be continued.)

Notes on the uncertain abundance of many Lepidoptera.

By W. H. TUGWELL.

In considering this most interesting subject, it is convenient to divide the species referred to into two classes. The first comprises the bulk of our truly indigenous Lepidoptera, which, although found every year in their respective haunts, yet from causes which are apparent to most observers, naturally vary in numbers from year to year. Each and every species have their many enemies which prey upon them, from the egg to the perfect state; it is little to be wondered that they should appear in greater or lesser numbers according to the coincident presence or absence of their many foes. What with birds, mice, coleoptera, ichneumons, ants, diptera, spiders, with unpropitious weather, &c., the marvel is that so many do reach maturity, and are able to carry on their race.

Very much could be written on this subject, but I purpose rather to treat on my second class, viz., those rare visitants that from time to time reach our shores. There are many lepidoptera of powerful flight and roving habit whose range is almost world-wide, and altered but little in character under widely different climes; still, of course,

there are conditions in which these rovers are unable to thrive, and where these obtain, this is what is generally known as the utmost range of the species. England naturally is the limit range of several strong flying species, they reach us it is true at irregular intervals of time, and in most uncertain numbers, but from climatic causes they are unable to thrive here; a few of them struggle to exist for a season or two, but soon die out, and were it not for fresh arrivals by immigration, our fauna list would soon know them no more.

Let us select a few cases.

Colias hyale is of very uncertain appearance, abounding for a season, and then perhaps lost to view for years; as a day-flying species, it could hardly fail to be detected if present with us. *C. edusa* varies much in its numbers, but still it does occur, possibly every year. The wonderful *Edusa* year (1877) I was spending six days in Tilgate Forest the first week in June, when tattered specimens of *Edusa* occurred all over the place; we could have caught any number if so inclined. These, of course, were the advance-guard of that wonderful abundance that appeared the following August. The autumn previous there had been no unusual number of *Edusa*, but here they were in most unlikely places, and in abnormal numbers; some of them were extremely large—the largest I ever saw—but all of them were travel-stained, *i.e.*, ragged, and probably immigrants.

Pieris daphidice and *Argynnis lathonia* are both of them rare visitants, and apparently affecting no colony here.

Vanessa antiopa is a good example of the second class. It has a powerful flight, and a very wide range of distribution. It is common through most of Europe, America, Canada, and in England it occurs some years as a visitant in fairly large numbers; in 1872 some 400 at least were reported. Yet, strange to say, the larva has never been seen in this country. This is a remarkable fact, because the habit of the larva is well known, and feeding gregariously on willows it could not fail to be detected if present. It is not like an obscure night-feeding species, and its non-detection must be accepted as a proof that it cannot breed here, doubtless from some climatic reason.

Anosia plexippus is another rare visitor. It has been taken in Sussex, *vide Entomologist*, Vol. IX., page 267, and some ten specimens were reported along the south-west coast of England in 1885, one of which, captured in Cornwall by a friend, is now in my possession. Here again we have every reason to believe that it has failed to establish itself, although it has done so over a wonderful area, through its great power of wing and roving habit.

Of the genus *Deilephila* probably all of them are visitants here. *D. euphorbia* was formerly established at Braunton Burrows, near Bideford, in Devonshire,* but it has long since disappeared from that locality, and is now rarely reported as a visitor. *D. lineata* is perhaps less rare, still it has no settled colony in England.

D. galii is doubtless the most frequent of the three, but still I am pretty certain that it fails to perpetuate its race in England, rarely appearing more than probably one or at most two consecutive years. Evidently our climate does not suit it. It is not warm or sunny enough for its healthy development as I have shown, *Y.N.*, p.p. 113 and 115; one season here produces a much smaller and doubtless weaker insect. Mr. C. A. Briggs admits that caught English specimens are larger than bred examples from English larvæ. But Mr. Briggs seems to ignore that if these caught English imagines are produced by English-fed larvæ, that some of us, out of the great number that have been bred from English-fed larvæ, should be able to match the caught examples, for it is simply absurd to say that all our bred ones must be starved by our feeding! Very many of my larvæ were full-fed and had changed colour for pupating when found, and I would ask Mr. Briggs why these should not be as large as the caught examples? The reason to my mind is not hard to see. It is the cold and wet autumn weather we get, and principally the want of bright sunshine, that weakens our English-fed larvæ and kills a very large percentage of them. This was proved by my own experience. After the first few wet and cold days we got in September last, I found the larvæ then moribund, and many dead; see also report of Mr. J. Arkle (*Entomologist*, Vol. XXI., page 257). Perhaps Mr. Briggs does not fully realize what an average three-eighths of an inch mean. Let him place, say the largest male specimen out of all he can get from English-fed larvæ, viz., 2 inches 10 lines (and only one of that size), and place it beside the males caught by Mr. J. T. Williams, at St. Margaret's, Kent; his males measured $3\frac{1}{3}$ inches and over that, they do not look like the same insect. My largest bred English female, $3\frac{1}{2}$ ins., looks small indeed beside my *French specimens* of $3\frac{3}{8}$ ins. Mr. Briggs is good enough to say that my previous remarks "are not even ripe for discussion," because I had failed to give detail of the size of *Galii* bred on the Continent; but I have no hesitation in telling Mr. Briggs that they would in no way affect the question. I do not suppose that bred *Galii* have been carted over here, but that continental

* Is there any evidence that the larvæ were found at Braunton Burrows more than once? If not, I would hardly consider the species established.—J.E.R.

specimens have immigrated here, possibly French, although as they do not travel labelled, one can only judge by their agreement with French examples in my possession, and these caught specimens never, or very rarely indeed, do agree with our English-bred insects. Of course, I fully agree that some specimens of English-fed *Galii* may be captured, as we know that they do breed here, but my opinion is that this brood is weakened and would fail to reproduce for more than at most two seasons, would get less in numbers from failing development, and that it is only in a season when we have had a flight of immigrants that we get a year like 1888. How rarely indeed do we get them in numbers two years consecutively. My experience in breeding lepidoptera is probably much more extensive than that of Mr. C. A. Briggs. I know that bred insects, when treated naturally, give as a result, specimens quite as large as those captured as imagines, and in many cases they are much finer. I can show larger bred specimens of *N. centonalis*, *N. albulalis*, and *A. ochrata*, than any specimens I have captured, and I have taken them all freely, and so with many others. Given that you inbreed several times, or treat your larvæ unskilfully, then naturally you dwarf your brood. In concluding my remarks on *D. galii*, I may mention that the passage from any part of France to the British Isles would have been easy flight for any of the strong-winged Hawk Moths. They have been reported at a very great distance from any land—hundreds of miles—and even insects of much weaker powers, as the *Pieridæ*, I have myself seen 15 to 20 miles from land, and apparently none the worse for their flight. It is well known that lepidoptera can settle on water and rise again, apparently refreshed by their bath, see *Entomologist*, Vol. VI, page 152.

With most of Mr. Sharp's article (*Young Naturalist*, p. 96) I most fully agree, only making exception for what I call visitors and irregulars, and then I think the cause is climatic, rather than what might be termed natural, *i.e.* enemies. As to Mr. Sharp's remarks on *Galii* larvæ being found in greater numbers on the Cheshire sandhills than on the South-east coast of Kent, *I do think he is mistaken*, and that *Galii* larvæ were possibly in greater numbers on our South-east coasts. My own captures were roughly 200, and that of course proves they were by no means rare in Kent. From these captures I have bred 111 imagines, and still three living pupæ remain. Not a single larvæ was attacked by any parasite, the greater part of the loss in number being by the death of those that pupated after the cold change of weather, and which fact points its own conclusion. There has been no record from Cheshire of any one taking as many. Of course it would

be difficult to form a perfectly correct table to prove one more than another, but at any rate Cheshire cannot show a capture of eighteen imagines last year, and that St. Margaret's alone does.

To conclude, I will name but one more large Sphinx, *Chærocampa nerii*. This grand species does, very rarely, reach England, but only as an immigrant. All I have ever seen in collections are in a more or less dilapidated condition. Mr. C. A. Briggs exhibited last year a specimen taken in London, but no one for a moment believes that the insect has ever fed up here, save from imported ova or larva, its food-plant is not to be found in England save as a cultivated green-house flower.

6, Lewisham Road, Greenwich.

The Pterophorina of Britain.

By J. W. TUTT, F.E.S.

The *Pterophorina*, or "plumes" as they are popularly called, are one of the most interesting groups of lepidoptera. They are so very dissimilar in the structure of the imago to all other groups, that it is almost impossible not to be able at once to refer them to the particular group to which they belong. Many of the species are so common, that the lepidopterist who has but just commenced to collect, is sure to meet with some of them. Their fragility makes them appear difficult to manipulate, and many collectors, I think, are thus deterred from taking up the study of this group; but, in reality, the specimens of this group are readily manipulated, and with a little practice, they can be set in a more satisfactory manner than can many species of the larger groups. The proper killing of the specimens is more important to success than any other particular, and I think there can be no doubt that liquid ammonia is by far the best substance with which to kill them. When collecting, if the specimens are placed in small card or chip boxes, and on arrival home, these boxes placed into a large tin, two or three drops of *strong* liquid ammonia dropped upon the boxes will kill any number (I kill nearly all my insects in this way, large and small), so long as the tin is air-tight. If this be done overnight, the insects will be in splendid order for setting all through the next day. With regard to pinning, black pins are undoubtedly the best, and of sizes I prefer 15's to any other. Perhaps a few words as to setting will not be altogether out of place. In the larger groups, the setting of the legs

is of secondary importance to that of the wings, and so long as the wings are fairly well set and the antennæ well out, most lepidopterists are satisfied; a few set the first and last pair of legs, but generally these look after themselves. In "plumes," it is absolutely necessary to set the legs, and the setting of these is of equal importance with the wings. If the insect is well pinned, the legs can easily be drawn into position before putting the insect completely down into its place on the setting-board, and then arranged afterwards. Probably the wings of the "plumes" are more easy to set than those of any other group. Just below the apex of the anterior wing is a cleft, into which a pin can be inserted and the wing drawn forward, the posterior wings generally fall into position, or if not, a little persuasion with a fine pin under the plumules will arrange them, when the bracing can be done in the ordinary way. So much for the mechanical part of the work.

With regard to the localities in which "plumes" may be found, lepidopterists who have already taken up the larger groups, will already know the localities and habits of many species, and if any collector who may, in anticipation of these papers, or otherwise, be taking up the "plumes" for the first time, will set what specimens he may capture, I shall be very pleased to name them for him. Many species are excessively local, but abundant where they occur, and collectors should take a fairly long series, as specimens of most of this group are always useful to friends.

The sub-division of the British *Pterophorina* was very crude until Dr. Jordan took up the matter some years ago, and gave us a new idea of their classification, *vide* "Entomologist's Monthly Magazine," Vol. VI., pp. 119 and 149. In the old Doubleday arrangement there was practically no sub-division of the group, because so little was known about it. With the exception of two species, they were all placed together under the one generic name *Pterophorus*, much in the same way as all the butterflies were originally called *Papilio*. As far back as Hübner's time, however, the necessity for sub-division has been realised by our leading lepidopterists, but the first real attempt in this direction was made by Herr Wallengren, in a "Monograph of the Scandinavian *Pterophori*," and the sub-divisions proposed by this lepidopterist are very natural. This arrangement was criticised and the leading points in it fully discussed by Dr. Jordan, and most of our leading lepidopterists at once adopted the application of it to our British species as proposed by Dr. Jordan in the "Entomologist's Monthly Magazine," Vol. VI., pp. 119 and 149, where a full list of our

species under the new sub-divisions was given. Dr. Jordan himself, and Lord Walsingham, in his "Pterophori of North America," closely followed this arrangement throughout their work on the group, and it was supported, and the necessity of the corrections made, recognised by Mr. C. G. Barrett in the "Entomologist's Monthly Magazine," Vol. XVIII, p. 177, since which time the advantages of this arrangement have never been seriously questioned, although one lepidopterist objected on other grounds (but this was scarcely worth the notice of scientific men), when Mr. South made use of Dr. Jordan's work, and transferred Herr Wallengren's sub-divisions bodily into "The Entomologist" list. According to the Doubleday arrangement, there were only three genera, *Agdistis*, *Pterophorus*, and *Alucita*. *Agdistis* contained only one species, *bennettii*; *Alucita* only one, *polydactyla*, all the rest were huddled into the genus *Pterophorus*. In the Wallengren arrangement the old genus *Pterophorus* is sub-divided into nine genera, five of these genera being Wallengren's; three, Hübner's; and one, Zeller's. These genera have now been generally accepted on the Continent for many years, and there are few scientific British lepidopterists who have not themselves, long ago, seen the necessity of accepting them. But Wallengren removed the genus *Chrysocorys* from the *Tineina* into this group, and in retaining this genus in our British classification, Dr. Jordan was not only guided by his own opinion, but also by that of our greatest living lepidopterist, Mr. Stainton, who supported him in this view. We have, therefore, in our British Pterophori, representatives of three groups *Chrysocoridae*, *Pterophoridae*, and *Alucitidae*, of which the first contains one genus, the second contains nine genera, and the last, one. With regard to these generic divisions I propose to give their special characters afterwards, when dealing with the species.

We have now to consider their position with regard to the other species of the British fauna. Dr. Jordan first suggested that their affinities were with the *Pyralidæ*, and "that they were rather an aberrant group of the *Pyralidæ* than of the *Tineina* (that is, taking the term *Pyralidæ* in its widest meaning), and of these, that the genus *Chilo* was their nearest ally"; but he adds "there is so much that is anomalous in the whole group that this is said rather with the view of opening a difficult question than of giving a positive opinion" ("Entomologist's Monthly Magazine," Vol. VI., p. 152). Whether any one has ever attempted to work out the exact position of this group I do not know, but Mr. South, acting presumably on the suggestion contained in the above paragraph, removed the *Pterophori* in the "Entomologist"

list, to the place here indicated. There is no doubt that they are, among the *Crambidae*, in a more natural position, and that Dr. Jordan was quite right in suggesting their removal from the anomalous position they had always held in all previous systems of classification, and now that their larvæ are better known, I think very few lepidopterists would be found who believe the affinities of the group to be in any way connected with the *Tineina*. To me their affinities seem more decidedly with the *Pyralidae*, an opinion which was shared by my friend Mr. Coverdale. Certain it is that the position suggested by Dr. Jordan, and carried out in the "Entomologist" list, is better than the previous lack of one.

The larvæ are generally hairy, so also are some of the pupæ; some of the species simply attach themselves by the anal segment to pupate, others make a loose cocoon; one species, *gonodactyla* (*trigondactylus*), sometimes makes a cocoon, at other times it is simply suspended.

With regard to the structure of the species of this group, one species, *Agdistis bennettii*, has all four wings uncleft, as also has *Chrysocorys festaliella*, but the others have the anterior wings more or less cleft, dividing the wing more or less deeply into two lobes; while the posterior wings are made up of three distinct plumules or feathers. So that in considering the structure we have the upper and lower lobes in the anterior wings, and the first, second, and third plumules of the posterior wings. The solitary British species of the genus *Alucita* has its anterior and posterior wings each divided into six plumules or feathers, and when well set, appears to me one of the most striking species in the British fauna.

All our species are more or less variable, and not only is this so, but many of the species are very closely allied; with regard, however, to variation, the most remarkable cases of variation occur with the larvæ, and ignorance of this has apparently led to a great deal of confusion in some of the species. I worked out the different phases of variation of one species (*gonodactyla*) last summer, and the results, published in the "Entomologist's Monthly Magazine," Vol. XXV., pp. 105-107, are very striking. Other species also vary very considerably, and descriptions of individual larvæ appear to me almost worthless, unless giving general characters of the different forms which occur; the descriptions of the larvæ of the species of this group should be made from a considerable number for comparison. The pupæ also vary much both in ground colour and markings. The markings of larvæ and pupæ consist essentially of darker dorsal and sub-dorsal

longitudinal lines, which, in many individuals are absent, in others, so strongly marked as to hide the ground colour. Perhaps the most reliable descriptions of the species of this group are those by Mr. G. T. Porritt; Mr. Gregson has described several; and many have been re-described by Mr. South in his series of "Contributions to the Pterophori," which have appeared from time to time in the "Entomologist," Vols. XIV—XXI. A series of plates accompanying the latter papers might have been much better than they are. The food-plant is generally well done, the larvæ and pupæ fairly, but the imagines are in many instances scarcely recognisable.

Although not generally known, many of the species of this group are double-brooded, or otherwise hybernate. Those lepidopterists who know that some particular species is double-brooded, are apt to think that everyone else knows it, and hence we get scarcely any record of the fact. Many species are out continuously for months, thus *tetradactylus* was out last year (1888) from May 24th to September 1st. Mr. Porritt, "Entomologist," XV., p. 262, mentions *serotinus* as occurring continuously from May to October, near Huddersfield. There is no doubt that these are continuously brooded and that many of the later specimens are the progeny of the early specimens of the same season. The second (or perhaps third) brood of *monodactylus* (*pterodactylus*) I have taken freshly emerged on the 6th of November in my own garden.

Alucita polydactyla is known to hybernate in the imago state, so also does *monodactylus*, *cosmodactylus*, and *acanthodactylus*, probably others do, but practically nothing is known of the way in which the various species pass the winter.

Although the following notes are written with the main idea of being of service to beginners, yet I have not thought fit to leave out references and other matters of detail which may make them more widely useful. For this reason I have also treated the various species in proper scientific order. These preliminary notes will, I trust, be sufficiently lengthy to enable those who are taking the group for the first time, to pin and set their specimens satisfactorily, the matter of identity can then be readily settled afterwards.

(To be continued.)

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 5th, 1889.—The Right Hon. Lord WALSLINGHAM, M.A., F.R.S., President, in the chair. Mr. W. M. Christy, of Watergate, Emsworth, was elected a Fellow of the Society.

Mr. S. Stevens exhibited a specimen of *Acrolepia assectella*, Zeller, included in a lot of *Tineidae* purchased by him at the sale of the late Mr. A. F. Sheppard's collection, and determined by Mr. Stainton. He also exhibited, for comparison, a specimen of *A. betulella*.

Mr. J. J. Walker, R.N., exhibited a collection of Lepidoptera made in 1887 and 1888 in the immediate vicinity of the Straits of Gibraltar. The collection included 68 species of butterflies, of which 36 were obtained on the Rock of Gibraltar itself, and the remainder on the European side of the Straits, and about 160 species of moths.

Dr. P. B. Mason exhibited a number of specimens of a South European species of Ant—*Crematogaster scutellaris*, Oliv. He said that the specimens were all taken in the fernery of Mr. Baxter, of Burton-on-Trent, and had probably been imported with cork.

Mr. O. E. Janson exhibited a pair of *Neptunides stanleyi*, a species of *Cetoniidae*, recently received from Central Africa, and described by him in the February number of *The Entomologist*; also some varieties of *N. polychrous*, Thoms., from the Zanzibar district.

Dr. N. Manders exhibited a number of Lepidoptera collected by himself in the Shan States, Upper Burmah; also a collection of Lepidoptera made by Captain Raikes in Karenni.

Mr. M'Lachlan exhibited over 400 specimens of Neuroptera, being a portion of the collection formed in Japan by Mr. H. J. S. Pryer. They represented nearly all groups (excepting *Odonata*, now in the hands of Baron De Selys). Some of the *Ascalaphidae*, *Panorpidæ* and especially *Trichoptera*, were of great beauty; notably amongst the latter was the curious moth-like genus *Perissoneura*, M'Lach.

Dr. Sharp exhibited the peculiar cocoons of an Indian Moth, *Rhodia newara*, Moore; these were the cocoons possessing a drain at the bottom in order to allow water to escape, already described in the "Proceedings of the Zoological Society" for 1888, p. 120, where, however, their great resemblance to the pods of a plant had not been alluded to.

Mr. Enock exhibited, and made remarks on, specimens of *Cecidomyia destructor*, bred from American wheat.

Mr. W. Warren exhibited a bred specimen of *Retinia posticana*, Zett., from Newmarket; also specimens of *Eupithecia jasieneata* and *Gelechia confinis*, bred by Mr. Gardner, of Hartlepool.

Mr. C. O. Waterhouse exhibited and explained a number of diagrams illustrative of the external characters of the eyes of insects. A discussion ensued, in which Mr.

M'Lachlan, Mr. Verrall, Lord Walsingham, Mr. Jacoby, Mr. Kirby, and others took part.

Mr. A. G. Butler communicated a paper entitled "Descriptions of some new Lepidoptera-Heterocera in the collection of the Hon. Walter D. Rothschild." He also contributed a second paper entitled "Synonymic Notes on the Moths of the earlier genera of Noctuides."

Dr. Sharp read a paper entitled "An Account of Prof. Plateau's Experiments on the Vision of Insects." Lord Walsingham, Mr. Jacoby, Mr. White, and Mr. Waterhouse took part in the discussion which ensued.—H. Goss, *Hon. Secretary*.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

May 16th, 1889.—Mr. HUCKETT, Vice-President, in the chair. Mr. Clark exhibited a series of *Agarista glycina* from Victoria, and read a paper on behalf of Mr. E. Anderson, entitled "A day's collecting on the banks of the river Yarra." This paper was of a very interesting character, giving detailed accounts of the habits of various species of lepidoptera found in that country, and also interesting items for the general naturalist. Mr. Manley exhibited a series each of *C. anachoreta* and *O. bidentata*, all bred; the latter species showing some nice variation. Mr. Hanes, series each of *C. videns* (second season's breeding), *L. lobulata* and *E. abbreviata*. There were several large exhibits of coleoptera. Mr. F. Milton's box contained *Silpha littoralis* and *Hydrous caraboides*, from Stamford Hill, and *Rhynchites pubescens*, from Esher. Mr. Boden exhibited *Hyllobius abietes*, *Silpha atratus*, *Rhagium inquisitor*, and living specimens of *Gibbium scotias*. Mr. Lewcock, the congener of last-mentioned species, viz.: *Mezium affine*, also alive, and pointed out the difference between the two species. Mr. Jarvis also exhibited coleoptera.

June 6th, 1889.—Mr. HUCKETT, Vice-President, in the chair. Mr. Clark exhibited a series of *E. lariciata*, from Forres, also male specimens of *Lucanus cervus*, and remarked upon their unusually small size. Mr. Battley, series of *A. citraria*, *P. radiella*, &c. Mr. Hanes, series each of *T. rubricosa*, *T. gracilis*, and *N. cristulalis*, also larvæ of *X. scolopacina*, and observed that the latter species was very common this season, notwithstanding the large number taken every year by collectors, and the building operations in the vicinity which were gradually enclosing their headquarters. Mr. Bellamy exhibited a series of *T. gothica*, showing a fine variation. Mr. Battley mentioned that he had observed a large flight of insects, chiefly *P. brassicae* and *P. napi*, off Gravesend, the insects were apparently leaving the Kentish coast. The scarcity of the the larvæ of *T. viridana* was also commented upon. The localities last year, in which the larvæ were so abundant that the oaks were entirely denuded of foliage, were comparatively free from the insect this year. A trig of oak was also exhibited showing the contrast of the two seasons, the leaves being entirely perfect; last year the same tree was bare, not a leaf remaining. In coleoptera, Mr. Milton again exhibited *Silpha littorales*, remarking that he had been able to secure five specimens of the species this year, all from fish; comprised also in his exhibit

were *Callidium violaceum*, captured from the open window at Tottenham, and a quantity of other species. Mr. Battley, *Lasia globosa*, from Southend. Mr. Lewcock remarked on the abundance of homoptera, stating that he had counted as many as 30 specimens of the Scarlet Hopper (*Triecphora vulnerata*), on one tree at Chatten-den Woods, June 1st, and had likewise taken *Cercopis cornutus* at the same time; coleoptera were also plentiful at this locality, among other things captured on this occasion were *Chrysomela varians*, *Campylus linearis*, *Lasia globosa*, *Sitones crinitus*, &c. Mr. Pearson exhibited a specimen of *Blaps similis*, taken in a house at Stoke Newington.—E. HANES and G. A. LEWCOCK, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

May 23rd, 1889.—T. R. BILLUPS, Esq., F.E.S., President, in the chair. Mr. Tugwell exhibited *Acidalia aversa*, bred from a strongly banded grey form, the only examples bred were specimens of a rich ochreous brown banded form, and the var. *spoliata*. Mr. Tutt, long series of *Cidaria russata* and *C. immanata*, also *Tephrosia crepuscularia* and *T. biundularia*, and made some observations on the two last species. Mr. South, long series of *Hypsipetes sordidata*, comprising examples of the species from various English and Scotch localities, also *Larentia didymata*, and read notes relative to his exhibit. Mr. White, Hymenoptera collected in the neighbourhood of Colchester. Mr. Billups, *Lithocharis piceus*, *Actobius signaticornis*, and *A. villosulus*, from Lewisham; also the following Ichneumons: *Banchus variegator* bred from *Trachea piniperda*, and *Ophien luteum* bred from *Dicranura vinula*. Mr. Carrington contributed notes on collecting at Horsley, Surrey. Mr. White read a paper, "Observation versus Collection.

June 13th, 1889.—J. T. CARRINGTON, F.L.S., Vice-President, in the chair. Mr. Moore exhibited species of lepidoptera from Antigua. Mr. Wellman, *Macroglossa fuciformis* and *Nemeobius lucina*, also living larvæ of *Halias vaularia*, shewing variations. Mr. Helps, *Selenia illustraria*. Mr. Robson, specimens of *Sesia formiceformis*, with yellow bands. Mr. South, specimens of *Cidaria russata* and *immanata* from various localities, and referred to the first-named as having been honoured with no less than eight names, and having been placed in half as many genera, not including *Phalaena* and *Geometra*, which were rather tribes or divisions than genera. Seeing how variable the species was, the multiplicity of trivial names was hardly a matter for surprise; few, if any, of the entomologists of the present day were inclined to claim specific rank for the forms now so generally admitted to be aberrations of *C. russata*. As regards *C. immanata*, this insect was not so deeply involved in the synomic web as that previously considered. Mr. South then proceeded to refer to the various forms and varieties, and illustrated his remarks by his exhibit. Mr. Tugwell made some observations on collecting during the present season.—H. W. BARKER, Hon. Sec.

Notes and Observations.

POLYGAMY AMONG STARLINGS.—I venture to record the following instance of polygamy. On April 1st, I was watching a starling sitting on the edge of a gutter just under my window. After a minute or two it flew away, and disappeared in a hole in a tower not far off. It had hardly entered the hole before two more appeared and settled on the gutter. One of them, which had something in its beak, then entered the hole, very soon it came out and perched beside that still sitting on the gutter. After a few moments of what seemed a very animated conversation, the third entered the hole. Not long after the two came out, and perched alongside that left on the gutter. I often saw all three afterwards going into the hole in turns, carrying bits of straw, &c., for the nest. The nest is in an old tower of Radley College, Oxford.—D. H. STEWART.

THE FOOLISH GUILLEMOT (*Colymbus troile*).—One of my friends brought me one of these beautiful birds in full feather, which he had picked up in the sea alive, but which was so light (about 12 ozs.) that I looked for the cause. I found the upper mandible broken by a small shot, and thus the bird could not catch or hold its food, and so had wasted to a mere skeleton. When I told him its name, he observed, "Yes, its very funny, I've been fishing all my life, but I never knew they were so silly as to let us pick them up before." My experience as an old sea-fowler is that they are very wary birds. Did they get the name "foolish" from a similar cause?—C. S. GREGSON, Liverpool.

SPHODRUS LEUCOPHTHALMUS, L.—Mr. R. W. Thompson, of Regents Park, sends me "a fast-running cellar beetle" (for want of a better name); I find it to be an excellent specimen of *Sphodrus leucophthalmus*. This is the second occasion on which I have had the pleasure of receiving this insect from Mr. Thompson.—G. A. LEWCOCK, 73, Oxford Road, Islington, N., May 13th, 1889.

LITHOSIA CANIOLA.—On the 8th June I visited Torcross, a very quiet little village on the South Devon coast, for a few days' recreation and to have a look at the insect life again in this locality; searching one evening among the herbage along the coast, I was delighted to find half-a-dozen of my old acquaintance *Lithosia caniola*, all feeding on the flowers of the Kidney-vetch (*Anthyllis vulneraria*.) I first found this larva at Bolthead, in June, 1872, for particulars, vide *The Entomologist*, Vol. VI, p. 261.

PHYTOBIUS LEUCOGASTER, &c.—This rather out-of-the-way place would, I have no doubt, if well worked, prove not only interesting to entomologist, but also to the the coleopterist; I paid a slight attention to the water beetles one forenoon, and was rewarded with that beautiful little weevil *Phytobius leucogaster*, which Rye and Fowler have placed in the genus *Letodactylus*; this beetle, and *Helophorus granularis*, and *Enochrus bicolor*, I found among the *Myriophyllum spicatum* (water milfoil) and conferva growing on the side of the “lea” (lake), although the above-named were taken, I was in search of *Bidessus minutissimus*; this rarity I believe, is only taken in this lea. I did not obtain it, the time of year perhaps had something to do with my not finding this beetle.

TYCHIVS POLINEATUS.—I obtained this rare little weevil on *Anthyllis vulneraria*.

LOPUS SULCATUS.—The hemipterist would have some sport, for in my ramble I found that handsome species *Lopus sulcatus*; this rare bug has only another habitat recorded in England, viz.: Portsmouth. This species has been added to the list since the publication of the “Ray Society’s” Vol. on the “British Hemiptera,” by Douglas and Scott. Mr. Edwd. Saunders recorded its capture in the *Entomologists’ Monthly Magazine*, Vol. XII, p. 186. I found four specimens on *Senecio vulgaris* (groundsel), four on *Chenopodium ficifolium* (Fig-leaved Goosefoot), and five on *Anthyllis vulneraria* (Kidney-vetch), all these plants were in isolated patches.

This natural lake is very remarkable, it is about two miles in length, abounding in pike, perch, and rudd, and in the winter is a favourite haunt of wild fowl, in fact, many breed in it, and like the fish, never leave it until carried away in the sportsman’s bag; this lake is only separated from the sea by a shingle road, a few years since some enterprising residents of the neighbourhood determined on trying the experiment of making a solid road, by carting a lot of earth on the loose shingle, the plan succeeded above their expectation, consequently there is a splendid drive of two miles, with the sea on one side and a lovely lake on the other; the fishing and shooting is preserved, but permission can be obtained for these.

The courteous manager of the Torcross Hotel not liking this, obtained permission and made another “lea” of about forty acres in extent, in which you can fish to your hearts’ content, and as a sample of the fish to be obtained, a gentleman last week captured a pike weighing over 16 lbs., many others were taken last season much heavier. Should the visitor prefer sea-fishing, a boatman will be obtained by this enterprising proprietor at the modest sum of four

shillings and sixpence per day, per man. The charges at this hotel are moderate and the accommodation everything you can wish for, food and drink of the best quality, and cleanliness in everything.

I hope next year to spend a much longer time in this lovely locality, and again to patronize the Torcross Hotel.—G. C. BIGNELL, Stonehouse, Plymouth, 12th June, 1889.

LEPIDOPTERA OF SUTHERLANDSHIRE.—I should be very glad if any one could give me a note of any species known to occur in this county and the localities. I hope to spend a fortnight there this season, from Thurso right round about Trague and Strathreover. I can find nothing published about the lepidoptera of Sutherlandshire, and any hint would be a great help to me.—JOHN MACKAY, Glasgow.

ACRONYCTA MYRICÆ.—Why is this insect always associated with *Myrica gale*? I have had hundreds of the larvæ, and never yet found one on the sweet gale. It will not eat it even unless the larva are really starving. Most of our best districts are highly cultivated districts, where *Acronycta myrica* is found contentedly feeding upon the low plants and weeds, growing along the edges of fields, and by dyke sides, stone fences—in the interstices of which it spins up. It is also very easily reared upon low plants such as thistle, sorrel, dock, plain-tain, &c., but I find they will feed up readily upon birch, seeming to prefer it to other food.—W. REID, Pitcaple.

N. NEURICA VAR. HESSII.—Var. *Hessii* of South's list, according to Guenée, is synonymous with *Dissoluta Treitschke*. I believe the gradual extinction of the particular form in England to be due principally to drainage and consequent alteration of character and climate. The form has, I believe, become rare on the Continent, probably from the same reason. All the specimens in my series are males.—T. W. TUTT, Westcombe Park, London.

AMPHYDASIS BETULARIA VAR. DOUBLEDAYARIA.—On May 16th I bred a black specimen of *Amphydasis betularia*, from a pupa taken at the roots of an oak tree. Last year I found a very worn specimen in a spider's web, and about four years ago I bred a cripple of the same kind. Perhaps some of the readers of the Y.N. could tell me whether this is a northern variety or not?—D. H. STEWART, Oxford.

TEPHROSIA CREPUSCULARIA.—In the last issue of the Y.N., I noticed that a correspondent called attention to the late appearance of this moth. While collecting in Epping Forest on June 6th, I observed two specimens on the trunk of a tree, one in very fine condition, the other rather worn.—F. MILTON, 164, Stamford Hill, London, N. (Were these not *biundularia*?—J.E.R.)

The Honeysuckle (*Lonicera periclymenum*.)

By J. P. SOUTTER.

"First a cloud of fragrance. Then one sees
Coronets of ivory, coral, and gold,
Full of luscious treasure for the bees,
In their hedgerow-wreathage manifold
Clustering, or outswinging at their ease,
Watching in the hayfield those who hold
Scythe and rake, or overpeering bold
Dusty wayfarers 'twixt roadside trees.
Honeysuckle-scented summer night!
Leaves above and dewy woods around
Save the purring night jar not a sound,
Save the tender glowing stars no light,—
Thou hast hid thy lovers out of sight,
Bower'd, or wandering through enchanted ground."

Few of our native wildflowers are better known or more beloved than the honeysuckle. And scarcely anything fairer can be pictured than a shady thicket in leafy June or sultry July, when its trees and shrubs are clothed and canopied with the luscious creamy clusters of sweet-scented flowers of the woodbine. Or to see it clambering over the rocky surface of some rugged precipice, festooning the shady grottos and caves with its slender twining interlacing branches and feathery fringes of blossoms. What memories does it revive of rural cottages with rustic porches buried in its delicate greenery, where:—

"The honeysuckle round the porch hath woven its wavy bowers;"

and its delicious odour haunts one since childhood's days, when to gather a bouquet of its fragrant flowers was a chief event of a country ramble.

The honeysuckle is remarkable for its woody twining stems, these in vigorous plants will grow six, eight, or more feet in a single season. At first they are covered with a beautifully pink and downy epidermis, but as they get older it cracks and ultimately peels off in great flakes or long stripes, giving the old stems a curiously ragged and naked appearance. A noteworthy property of the woodbine stem is this power of twining around an adjacent slender support. This faculty of climbing is a provision bestowed upon many weak-stemmed plants, by means of which they can rear themselves into the air and light, and thus raise their flowers into the sunshine above the surrounding undergrowth. The diverse ways by which they attain this desirable end are very various, in some cases, as peas, it is by means of tendrils—fairy-like fingers which seize hold of neighbouring twigs, and

thus elevate themselves; or it may be holdfast roots as in the ivy, by which it can crawl up the ruined wall, or rugged cliff, or giant tree; or it may be hooked prickles as of the rose and bramble which enables these aggressive plants to scramble up, through and over the hedges and thickets; or yet again, as in the hop, convolvulus, and honeysuckle, the stem itself clasps and encircles its support. It is interesting to watch a stem such as the honeysuckle in its attempts to seize hold of a support. It first stretches out a long slender shoot, gradually lengthening as it grows, and unceasingly circling round and round in a direction following the course of the sun, if it reaches a suitable support it twines round it in an ascending spiral from left to right. Should no external aid be near, if it meets with another shoot of the same bush, the two will lovingly embrace, and on the principle of "Union is strength," will twine round each other, and thus gain an added strength to stand erect. Should all these fail the weak stem soon lies prostrate on the ground.

Owing to the mode of growth of our forest trees, *i.e.*, by annual fresh layers of wood being laid on externally to that already formed—hence their increase in diameter—the presence of honeysuckle in young plantations is apt to be injurious, because its tough woody stem, tenaciously clasping the young tender growing sapling prevents its due expansion, and ultimately it would die, strangled by the all too powerful embrace of its too closely attached friend. As a first result, singularly channelled spiral grooves are formed on the young tree by the endeavours of the descending sap to force a passage over the impeding barrier. These eccentric growths are often sought after and made into walking sticks curiously carved by Nature's own fingers. As a decorative plant for walls, trellises, or to cover decaying stumps or trees the honeysuckle is invaluable. It leafs very early, in mild winters it is not unusual to find it with fully developed leaves in February, and its foliage withstands strong sunshine as well as frost, and is not so liable to be devoured by predatory insects as some others. Yet the individual leaves are often most singularly etched as it were, by the meandering track of a burrowing larva, which eats for itself a winding and ever widening track betwixt the upper and under surface of the leaf, yet never piercing the epidermis till it is ready to to emerge into the open air. Its circuitous course can be traced by the white trail it leaves, which looks as if drawn in chalk on the green substance of the leaf.

The honeysuckle flowers are borne in dense clusters of ten to twenty at the extremities of the branches. Each little round ovary is

surrounded by a tiny pink cup or calice, and surmounted by the five teeth of the calyx, from which springs the long tubular corolla. Externally it is pink, and whilst immature resembles a cluster of coral, or it may be likened to a bundle of Indian clubs to be used for musical drill by the fairies. When fully developed the corolla tube opens, and becomes split for one-third of its length into two unequal lips, the upper of four united petals as shown by its four-toothed apex, and the lower of one strap-shaped petal. The inner surface of the petals are of a rich creamy colour, and at the base of the long tube is secreted a quantity of nectar, which makes the blossoms very attractive to insects, and children are never weary of pulling off and sucking the tubular corollas for their luscious sweets. The five stamens which are inserted within the corolla tube, are protruded beyond its orifice by their long filaments, on the top of which the anthers are delicately poised so as to quiver with every breath of air, they reach nearly on a level with the long slender style, which rising from the top of the ovary, attains a height of fully two inches. It is amazing how the pollen grain—individually so small as to be scarcely visible to the naked eye—can evolve a tube which will penetrate the whole length of the style, and convey the fertilising influence to the ovules there waiting to be fecundated, and thus become the seeds of the plant. The flowers of the honeysuckle are succeeded by a cluster of bright scarlet berries, which in autumn adorn our hedges, and almost rival in beauty the blossoms which preceded them. The flowers of the honeysuckle being so highly specialised, show very considerable variability of structure, such as becoming double, or the corolla being regularly split into five divisions, or sometimes even wanting altogether. A very common modification is virescence, the whole flower assuming a green colour; indeed there is scarcely any floral malformation but is represented in the honeysuckle.

The popular name of woodbine alludes to its creeping habit, and its encircling and thus binding trees and shrubs together. It is from the Anglo-Saxon *wudn-winde* or *wudn-bind*==*wudn* a tree, and *windan* twine, or *bindan* bind.

It has been supposed that Shakspeare, in the "Midsummer Night's Dream," applies this name of woodbine to the bitter-sweet, another climbing, creeping, shrubby plant, but with the power of twining less fully developed. Titania sings:—

"Sleep thou, and I will wind thee in my arms
So doth the woodbine, the sweet honeysuckle
Gently entwist—the female ivy so
Enrings the barky fingers of the elm."

The name is sometimes given to the great bindweed, *Convolvulus sepium*, another notorious and common twiner—but as its stems are herbaceous, it is scarcely so appropriate. Apart from these instances the woodbine seems to have no rival to the name. But it is otherwise with “honeysuckle,” although by poets and popular usage this is now restricted to the woodbine. Yet the farmers call the common red clover “honeysuckles,” and this is a popular name in certain districts of England. In the older herbals, the name seems to be applied indifferently to the primrose and cowslip as well, and perhaps included other long tubular honey-bearing flowers. A suggestion has been hazarded that the name has been transferred to the honeysuckle because of the amount of “honey-dew” deposited upon its leaves.

The generic name of *Lonicera* is given in honour of a sixteenth century botanist, Adam Lonicer; and the specific name *periclymenum*, from *peri-cleio* to enclose or entwine, appropriately alludes to its habit of growth.

For such a popular and well-known flower there are very few legends or folk-lore tales associated with it. In Scotland it was sometimes used along with the more potent rowan-tree as a preventive of witchcraft in cattle. In the language of flowers it symbolises “fraternal love” or “the bonds of affection.” The poets have long and sweetly sung its praises. A rather gushing versifer of a former generation gives it a rare antiquity:—

“ Oh ! the lily is lovely as when it slept
On the bosom of Eden's lake ;
And the woodbine smells sweetly as when it crept,
In Eden from brake to brake.”

And Wordsworth so delicately recalls childhood's memories by his allusion in “The White Doe of Rylstone”:—

“ Ere she had reached yon rustic shed
Hung with late flowering woodbine, spread
Along the walls and overhead,
The fragrance of the breathing flowers
Revives a memory of those hours
When here, in this remote alcove,
A fondly anxious mother strove
To teach her salutary fears,
And mysteries above her years.”

And others, too, elaborates the same sentiment—

“Entwined
With dripping honeysuckles, whose sweet breath

Sinks to the heart—recalling, with a sigh,
Dim recollected feelings of the days
Of youth, and early love."

Keats, with his marvellous felicity of diction, says:—

"A filbert hedge with wild briar overtwined
And clumps of woodbine, taking the soft wind
Upon their summer thrones."

And yet another, exercising a little poetic licence:—

"With clasping tendrils it invests the branch
Else unadorned, with many a gay festoon
And fragrant chaplet; recompensing well
The strength it borrows with the grace it lends."

It seems to have been one of the favourite flowers of Shakspeare, in a most familiar passage:—

"I know a bank where the wild thyme blows,
Where oxlips and the nodding violet grows;
Quite o'er-canopied with luscious woodbine,
With sweet musk roses, and with eglantine."

and again—

"And bid her steal into the pleached bower,
Where honeysuckles, ripened by the sun,
Forbid the sun to enter."

Milton, in "L'Allegro," is understood to refer to the woodbine under the name of eglantine, a name usually conferred on the sweetbriar—

"Through the sweetbrier, or the vine,
Or the twisted eglantine,"

which happily describes the twining habit of the honeysuckle. He rather disparages it in "Comus":—

"I sat me down to watch upon a bank
With ivy canopied, and interwove
With *flaunting* honeysuckle:"

but he makes up for it in "Lycidas," where although not a funeral plant, he classes it with

"The glowing violet,
The musk rose, and the well attired woodbine."

Burns, with his wealth of rural imagery fairly revels in his descriptions of the woodbine:—

"The woodbine I will pu',
When the evening star is near,
And the diamond draps o' dew
Shall be her e'en sae clear."

The same simile occurs in—

“ Her breath is the breath of the woodbine,
Its dewdrap o' diamond her eye.”

And in one of his most familiar lyrics—

“ Aft hae I roved by bonnie Doon,
To see the rose and woodbine twine.”

Another happy combination is—

“ Let fragrant birks in woodbines drest,
My craggy cliffs adorn.”

And what could more felicitously describe the loss of a parent bereft of loving, tender offspring?—

“ So deckt the woodbine sweet yon aged tree,
So from it ravished, leaves it bleak and bare.”

I shall close with a quotation from Cowper's “ Winter Walk at Noon ” :—

“ Copious of flowers the woodbine pale and wan,
But well compensating her sickly look
With never cloying odours, early and late.”

Bishop Auckland, July, 1889.

The Pterophorina of Britain.

By J. W. TUTT, F.E.S.

(Continued from page 150.)

Before, however, leaving the more general part of these papers, and proceeding to give a detailed description of the various genera and species, I have determined to give a summarised table, dealing with:—(1) the time of appearance in the imago, larval, and pupal states, (2) the kind of locality particularly affected by the species, and (3) the more common food-plants of the larva. The Roman numerals denote the month of appearance, and these dates are, as a rule, the result of my own observation, coupled with that of Messrs. G. T. Porritt and J. B. Hodgkinson, so that the time given includes the appearance of the species both in the north and south of England. Variations in time occur according to the season (temperature, &c.), and at the best, the table can only be looked upon as a rough guide and only as approximately correct for any given season. When the information has been obtained from previously published works, the fact is recorded.

Tabulated Form shewing (1) Time of Appearance in Larva, Pupa, and Imago states. (2) Locality.
(3) Food-plant of the British Species of *Pterophorina*.

| | TIME OF APPEARANCE. | | | | Habitat. | Food-plant. |
|--|--|--------------------------|----------------------|--|--|--|
| | Imago. | Larva. | Pupa. | | | |
| CHRYSOCORYS, <i>festaliella</i> | V-VI. and VII. and VIII-IX. (?) | IX-X. and VI and VII. | IV. and VI. and VII. | | Gardens, woods, &c. | Raspberry and bramble. |
| AGDISTIS, <i>bennetii</i> | VI. and VII-VIII. | IV-V. and VII. | V-VI. and VII-VIII. | | Salt marshes. | Sea lavender (<i>Statice limo- nium</i>). |
| CNEMIDOPHORUS, <i>rhododactylus</i> .. | VII. | V-VI. | VII. | | Woods and hedge- rows in South of England. | Wild rose (<i>Rosa</i>). |
| PLATYPTILIA, <i>**ochrodactyla</i> .. | VIII. | VI-VII. | VII-VIII. | | Roadside banks, fields, gardens, &c. | Tansy (<i>Tanacetum vulgare</i>). |
| <i>bertrami</i> (<i>ochrodactylus</i>). | VI-VII. | V-VI. | VI-VII. | | Hedgerows, banks, fields, &c. | Yarrow (<i>Achillea millefo- lium</i>), and <i>A. ptarmica</i> (<i>E.M.M.</i> , vi. 151). |
| <i>isodactylus</i> | VI. and VIII. (<i>E.M.M.</i> viii., p.154) | V. and VII-VIII. | VI. and VIII. | | Marshes. | Marsh ragwort (<i>Senecio aquaticus</i>). |
| <i>gonodactyla</i> (<i>trigondactylus</i>). | VI. and VIII-X. | IV-V. and VII. | V-VI. and VIII. | | Banks, fields, waste places. | Coltsfoot (<i>Tussilago far- fara</i>). |
| <i>zetterstedtii</i> | VII. | V-VI. | VI. | | Woods. | <i>Senecio</i> , sp. (?) <i>S. nemoren- sis</i> (?) (<i>Ent.</i> xxii., 30). <i>Solidago virgaurea</i> (?) |

| | TIME OF APPEARANCE. | | | Habitat. | Food-plant. |
|--|---|-------------------------|----------------------|---|--|
| | Imago. | Larva. | Pupa. | | |
| AMBLYPTILIA, .. <i>acanthodactylus</i> .. | V. (hybernated), VII-VIII and X. | VI-VII. and VIII-IX. | VII. and IX-X. | Banks, heaths, chalk hills, &c. | Hedge woundwort (<i>Stachys sylvestica</i>), ling (<i>Calluna vulgaris</i>) (?), rest-harrow (<i>Ononis arvensis</i>), and com. garden geranium. |
| <i>cosmodactylus</i> .. (<i>punctidactylus</i>). | V. (hybernated), VII-VIII. and IX-X. | VI-VII. and VIII-IX. | VII. and IX-X. | Waste land, hill- sides, &c., hyber- nates in furze bushes, &c. (<i>E.M.M.</i> , xxii, 150). | <i>Stachys sylvestica</i> . <i>Aquile- gia vulgaris</i> (<i>E.M.M.</i> , vi., p. 151). |
| OXYPITILUS, ** <i>distans</i> | VI-VII. and VIII. | VI. (?) and VII. (?) | VI. (?) and VII. (?) | Old coast sands (now inland), coast districts. | <i>Hieracium</i> (?), <i>Andryala sinuata</i> (<i>E.M.M.</i> , vi, 151). |
| ** <i>tenorii</i> | VII. | V-VI. | VI. | In woods, sandy heaths, and gravel pits. | Wood sage (<i>Teucrium scorodonia</i>). |
| * <i>filosella</i> | VII-VIII. | VI. | VII. | Mickleham Downs. | <i>Hieracium pilosella</i> . |
| * <i>hieracii</i> | VII-VIII. | VI. | VII. | | " <i>umbellatum</i> . |
| <i>parvidactylus</i> .. | VI-VIII. (contin- uously). | V-VII. | VI-VII. | Chalk hills and on limestone. | Hawkweed (<i>H. pilosella</i>). (Stainton's Man., p. 441). |
| MIMÆSEOPTILUS, (?) <i>phæodactylus</i> .. | VII-VIII. (com- mencement). | VI-VII. | VII. | Hillsides, &c., where food-plant occurs. | Wild Thyme (<i>T. serpyllum</i>). Rest-harrow (<i>Ononis arvensis</i>). |
| MIMÆSEOPTILUS, <i>bipunctidactylus</i> .. + (<i>bipunctidactylus</i>). + (<i>plagiadactylus</i>). | V-X. (continuously) | IV-VIII. | V-VIII. | Fields, meadows, woods, chalk hills, marshes, &c. | Terminal shoots & flowers of scabious (<i>S. arvensis</i> , <i>columbaria</i> and <i>succisa</i>). |

| | TIME OF APPEARANCE. | | | Habitat. | Food-plant. |
|--|--|--|----------------------------|--|---|
| | Imago. | Larva. | Pupa. | | |
| MIMÆSEPTILUS, <i>sophodactylus</i> (Loewi). | VII-IX. " | V-VII. | VII-VIII. | Woods, &c., where food-plant occurs. | Common centaury (<i>Erythraea centaurea</i>). |
| <i>pterodactylus</i> (Fuscus). | VI-VIII. " | V-VII. | VI-VII. | Woods, hills, (almost everywhere). | Speedwell (<i>Veronica chamaedrys</i>). |
| CEDEMATOPHORUS, <i>lithodactylus</i> .. | VII-VIII. | VI-VII. | VII. | Woods, hills, fields, &c., wherever food-plant occurs. | Fleabane (<i>Inula dysenterica</i>), and <i>Congea squarrosa</i> . |
| PTEROPHORUS, <i>monodactylus</i> (<i>pterodactylus</i>). | V. (hybernated), VI-XI. (continuously). | VI-XI. (continuously). | VI-XI. | Woods, gardens, &c., almost everywhere. | Convolvulus (<i>C. arvensis</i> and <i>sepium</i>). |
| LEIOTILUS, <i>linigianus</i> .. | VI-VIII. | V-VI. | VI-VII. | Roadsides, &c. | Mugwort (<i>Artemisia vulgaris</i>), <i>A. maritima</i> . (<i>E.M.M.</i> , vi., p. 151). |
| <i>tephradactylus</i> .. | V-VI. | IX-V. | V-VI. | Woods, &c. | Golden rod (<i>Solidago virgaurea</i>). |
| <i>osteodactylus</i> .. | VI-VII. | IX-VI. | VI. | Woods, &c. | Golden rod (<i>S. virgaurea</i>), <i>Achillea millefolium</i> (?), and <i>Artemisia vulgaris</i> (?) (<i>Ent.</i> , xviii, p. 99.) |
| <i>microdactylus</i> .. | V. (first brood), VII-VIII. (second). | IX-IV. (1st.), VI (2nd.) | IV. (1st.), VI-VII. (2nd.) | Chalk hills, fens, &c. | Hemp agrimony (<i>Eupatorium cannabinum</i>). |
| PSELNOPHORUS, <i>brachydactylus</i> .. | VII., (Merrin's Calendar) | VI. (Merrin's Calendar and <i>Entom.</i> , xxii, p. 36). | VI. | | <i>Prenanthes purpurea</i> (Stainton's Manual); <i>Lactuca muralis</i> (<i>E.M.M.</i> , i., p. 215, and vi., 151). |

| TIME OF APPEARANCE. | | | | Habitat. | Food-plant. |
|--|--|-----------------|------------------|---|---|
| Imago. | Larva. | Pupa. | | | |
| ACIPTILIA, (?) <i>fulvum</i> .. | VI. (Merrin's Calendar and <i>E.M.M.</i> , ii., p. 263), VI. & VIII. (<i>Ent.</i> , xx., p. 326). VI-VIII. (continuously). | V. (?) and VII. | VI. (?) and VII. | Marshes. | |
| ACIPTILIA, <i>tetractylus</i> .. | | V-VII. | V-VII. | Chalk hills, &c. | Thyme (<i>T. serpyllum</i>). |
| <i>buliodactylus</i> .. | VII-VIII. | VI-VII. | VII. | Chalk hills, &c. | Marjoram (<i>Origanum vulgare</i>). |
| <i>spilodactylus</i> .. | VII-VIII. | V-VII. | VII. | Gardens, &c., on South coast. | White horehound (<i>Marubium vulgare</i>). |
| <i>galactodactylus</i> .. | VI-VII. | IV-VI. | V-VI. | Woods, &c. | Burdock (<i>Arctium lappa</i>). |
| <i>pentadactylus</i> .. | VI-VIII. | V-VII. | VI-VII. | Gardens, hedges, rows, &c. (almost everywhere). | Convolvulus (<i>C. arvensis</i> and <i>sepium</i>), &c. |
| ALUCITA, <i>hexadactyla</i> .. (<i>polydactyla</i> .) | IV-V. (hybernated) and VII-XI. | V-VII. | VII. | Gardens, lanes, &c. | Honeysuckle (<i>Lonicera periclymenum</i>). |

* According to Stainton's "Manual," Vol. ii., pp. 441-442. ** Not mentioned in Stainton's "Manual." † These are treated as distinct species by Stainton. Independently of the synonymy of this group, it has been suggested to me that it would be advisable in drawing up the above list, to insert in brackets under the recognised specific name, that used by Stainton in his "Manual," vol. ii., pp. 439-445, as this work is still the recognised text-book of British lepidopterists. This has been done, and

Having now finished the more general part of the subject, it will be necessary to describe the genera and species included in the *Pterophori* in detail.

Gossiping Notes on British Coleoptera.

By G. A. LEWCOCK.

II. THE BRITISH LIST (*Continued from p. 126.*)

For a space of five years or more, the British coleopterists enjoyed a complete rest, as nothing of any importance occurred during this period either to disturb or bewilder them; but the year 1871 witnessed the publication of Dr. D. Sharp's "Catalogue of British Coleoptera." Referring to this catalogue, Mr. Rye says:—"There has been of late years nothing worthy of reference but the second edition of Mr. Crotch's catalogue to embody the very numerous additions now constantly made to the list of the British coleopterous fauna. But.....owing to its want of authors' names, and to its arrangement being almost entirely at variance with that to which entomologists in this country have been accustomed, this latter work has not been of so much general service as could have been desired. Dr. Sharp's catalogue, however, will be found satisfactory in both these respects (although the authors' names are not supplied to the genera), and, apart from some orthographical discrepancies and other errors (corrected as to these latter, for the most part, in the work itself, and, as to the more important of them, in the *Entomologist's Monthly Magazine*, VIII, 84), leaves but little to be desired.....This catalogue represents an entirely original scrutiny of our species by its author, down to the end of Brachelytra. The urgent need of a new list has caused the somewhat premature publication of it; or, otherwise, the whole body of the catalogue would have been composed under similar trustworthy conditions; the remaining portion therefore, after the Brachelytra, may be considered as not fairly expounding Dr. Sharp's views."—(*Annual*, 1872).

The species are numbered throughout, commencing with *Cicindela campestris* (No. 1), and ending with *Alexia pilifera* (No. 3186). An addenda of 7 brings the total number of species up to 3193. The second edition of Mr. Crotch's catalogue enumerated 3081, which, on comparison with Dr. Sharp's number, gives an addition of 112 species new to the British list since the publication of Mr. Crotch's catalogue. Of this number (3193), however, "some 40 may be deducted as representing doubtfully indigenous species to which a place is still provisionally accorded, accidents in numbering.....and the Stylopidae, which no one possesses, and concerning which great difference of opinion still exists."—(*Annual*, 1872).

An account of the alterations effected by Dr. Sharp in the nomenclature is also detailed in the same volume, and several points referring to species reputed as British are also noticed by Mr. Rye. The letterpress and general style of the catalogue was altogether a great advance on any previous effort in this direction, and from this period dates a vast improvement in the production of literature relating to entomological science. The catalogue was presented to the public in the handsome 8vo. form adopted by the *Young Naturalist* and other leading magazines of the present day.

The eighth decade of the nineteenth century was certainly an epoch in the history of British coleoptera, and will be remembered by the student of this branch of entomology as the period in which the first complete "Handbook of the Coleoptera, or Beetles, of Great Britain and Ireland," was published. This work was brought out by Mr. Herbert E. Cox, Member of the Entomological Society, in the year 1874. To compile a work of this character requires a great deal of patient research, assiduity, and carefulness in describing the species; that Mr. Cox possessed these qualifications in a high degree is amply evidenced in the book he presented to us. To say that it was entirely free from any blemishes whatsoever would be going perhaps a little too far, but as a good trustworthy book for descriptions of the British species it stand pre-eminent and unrivalled. Of course here and there one meets with vague generic distinctions, and also one or two omissions, but, taken as a whole, Mr. Cox's work may be regarded as a great achievement, and one which may rank with the highest entomological literature. As a contributor to the current magazine either of that period or the present, I find no record of Mr. Cox's notes, but my resources and time are limited, therefore, I may have overlooked them. There is this much to be said, that the author in question must have been a very extensive collector, or he received a great deal of assistance from the advanced coleopterists of that time, as throughout the book we find the following expressions as to the prevalence or otherwise of the species:—"common," "not common," "rather common," "moderately common," "rare," "very rare," "scarce," and others, which denote the author's estimation of any individual insect. In the absence of the names of the localities in which the beetles are to be found, these terms are certainly misleading, and the student who expects to meet with such species as *Dytiscus lapponicus* in the South of England, or even anywhere south of the Clyde, would drag for years perhaps and never meet with them; and this omission of the localities and also of

habitats, is in some respects, a drawback, and it would have been quite as well under the circumstances to have left out the terms which apply to any beetle as a rarity or otherwise.

The changes made in the nomenclature are not so important as departure from the order of the plan adopted by Dr. Sharp, but, in referring to this, it may be as well to give Mr. Cox's own words:—"It was at one time customary to divide the Coleoptera into groups superior to families, the most generally received system being that dependent upon the number of joints in the tarsi, the order being divided into Pentamera, Tetramera, and Trimeria (in which the tarsi had generally five, four, and three joints respectively), and Heteromera, in which the front pair of tarsi had five joints and the posterior pairs four joints. This system, being subject to a great number of exceptions, fell into disuse, and it became usual to recognise no sections superior to families. This, however, appears to be so contrary to nature, that I have felt compelled to attempt to unite the families in groups by a combination of characters. In doing this I have had to remove the Erotylidæ, Coccinellidæ, and Endomychididæ from their usual position at the end of the series of Coleoptera to the Clavicornia (a group the component parts of which vary greatly in tarsal structure and in food), and also to place the Bruchidæ in the Phytophaga instead of the Rhynchophora. The Stylopidæ, which until lately were regarded as a distinct order, but have since been admitted, as it were under protest, among the Heteromera, in spite of their tarsal structure, I have placed at the end of the list, considering their peculiar thoracic formation to require their separation from the order. In consequence of their affinities with the Rhipiphoridæ, &c., I have located the Heteromera immediately before them."

Before leaving this subject, I would impress on all young students the value of this work in their search after knowledge of the coleoptera of the British Isles, and would also advise them to endeavour to possess themselves of a copy of it. I am fully aware that there have been difficulties in procuring the work, from the applications which have been made to me respecting it, but copies are still to be obtained.

From 1874 to 1882 a quietude existed, that is so far as the publication of new lists was concerned; but in the latter year, a small work appeared by Mr. F. P. Pascoe, entitled "The Student's List of British Coleoptera." It contained synoptic tables of the families and genera of the British species, and was compiled from the 1871 edition of Dr. Sharp's catalogue; but differing from the latter by commencing with the Coccinellidæ and ending with the Cicindellidæ, or completely in-

verting the order of Dr. Sharp's list. As the book never came into popular use, it may be passed over without further comment.

The year 1883 brought into notice two new catalogues, one by the Rev. A. Matthews and Rev. W. W. Fowler; the other being a second edition of Dr. Sharp's catalogue. A catalogue of British coleoptera was then greatly needed, as the former edition of Dr. Sharp's was exhausted, and copies for either reference or labelling were not to be obtained.

The first of these catalogues—that of Matthews and Fowler—was a very neat production indeed: printed in good clear type, the the generic names in capitals, the specific names in small capitals, the genera numbered from *Cicindela* (1) to *Platypus* (735), the species again numbered, showing how many belonged to each genus, the authors' names being placed after both genera and species, and an index appended to the whole, leaving nothing further to be desired in its completeness of detail. The system of the catalogue was based chiefly on that of Dr. Leconte and Dr. Horn, but throughout the whole catalogue the specific nomenclature of Dr. Sharp's list is used, the authors stating that they did "not feel either qualified to dispute these names, or at all inclined to alter names so familiar to British entomologists."

Dr. Sharp's second edition differed in style from the former one by having the generic names printed in antique capitals, but in other respects the style of the first edition was still adhered to, although authors' names were not appended to the genera. The estimation in which Dr. Sharp is held by coleopterists of this country will be quite sufficient guarantee for the success of the list. The number of species included therein make a total of 3251. There is a considerable difference in the arrangement of the families, several new divisions of genera, and a readjustment of the synonymy. There are several differences of spelling in the two catalogues, and also in the retention and rejection of doubtful or reputed British species. In some cases Dr. Sharp retains species, such for instance as *Lina tremulæ*, and Messrs. Matthews and Fowler erase it, holding the opinion doubtless, which is referred to in the *Annual*, of the synonymy of *longicollis* with *tremulæ*. Dr. Sharp probably has his own reasons for retaining this name. The genus *Coccinella* undergoes considerable alteration, and although it formerly contained 18 species, but six obtain a place under this genus now, *mutabilis* (changed to *variegata*) being relegated to *Hippodamia*; 19-*punctata* forms the genus *Anisosticta* by itself; *obliterata* and *bipunctata* come under *Adalia*; *oblongo-guttata* is now *Mysia*; and

Halyzia becomes the generic name of *ocellata*, *18-guttata*, *14-guttata*, *16-guttata*, *12-guttata*, *22-punctata*, and *14-punctata*; the remaining species, which comprise the genus *Coccinella*, are *variabilis* (as *decempunctata*), *11-punctata*, *5-punctata*, *7-punctata*, *labilis* (as *distincta*), and *hieroglyphica*. Alterations are abundant, but the foregoing is given as a specimen of the extent of Dr. Sharp's labour in the revision of the British list.

As this is the latest complete edition of the list of British species, I propose to deal with localities in the next paper.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

July 3rd, 1889.—The Right Hon. Lord WALSHINGHAM, M.A., F.R.S., President, in the chair.

The Rev. W. A. Hamilton (Calcutta), and Mr. H. W. Vivian (Glenafon, Taiback, South Wales), were elected Fellows of the Society.

A letter was read from Mr. E. J. Atkinson, Chairman of the Trustees of the Indian Museum, Calcutta, in which assistance was asked from British entomologists in working out various orders of Indian insects.

The following motion, which had previously been unanimously passed at the meeting of the Council, was read to the society:—"That papers containing descriptions of isolated species widely remote in classification of distribution, are, as a rule, undesirable for publication, as tending to create unnecessary difficulties for faunistic or monographic workers." Mr. M'Lachlan, Mr. Jacoby, Mr. Elwes, Dr. Sharp, and others took part in the discussion which followed.

Mr. J. W. Slater exhibited a doubtful specimen of *Arctia mendica*, L., which appeared as if it might prove to be a hybrid between that species and *A. lubricipeda*, L.

Mr. M'Lachlan, on behalf of Prof. Klapálek, of Prague, who was present as a visitor, exhibited preparations representing the life-history of *Agriotypus armatus*, Walk., showing the curious appendages of the case. Prof. Klapálek, in answer to questions, described the transformations in detail. A discussion followed, in which Mr. M'Lachlan and Lord Walsingham took part.

Mr. H. J. Elwes exhibited a specimen of an undescribed *Chrysophanus*, taken in the Shan States, Upper Burmah, by Dr. Manders, which was very remarkable on account of the low elevation and latitude at which it was found; its only very nearly appeared to be *Polyommatus Li*, Oberthur, from Western Szechuen, but there was no species of the genus known in the Eastern Himalayas or anywhere in the Eastern tropics.

Mr. G. T. Porritt exhibited a remarkable series of *Arctia mendica*, L., bred from a small batch of eggs found on the same ground at Grimescar, Huddersfield, as the batch from which the series he had previously exhibited before the Society was bred. This year he had bred forty-five specimens, none of which were of the ordinary form

of the species: as in the former case, the eggs were found perfectly wild, and the result this year was even more surprising than before.

Mr. R. W. Lloyd exhibited specimens of *Harpalus cupreus*, Steph., and *Cathormiocerus socius*, Boh., recently taken at Sandown, Isle of Wight.

Mr. O. E. Janson exhibited a fine male example of *Theodosia howitti*, Castelnau, a genus of *Cetoniidæ* resembling some of the *Dynastidæ* in the remarkable armature of the head and thorax. The specimen had recently been received from N. W. Borneo.

Mr. W. White exhibited specimens of *Heterogynis paradoxa*, Ramb., and stated that this insect represented an extreme case of degeneration, the mature female being only slightly more developed than the larva, the prolegs being quite atrophied. Lord Walsingham made some remarks on the subject.

Mr. W. Warren exhibited bred specimens of *Tortrix piceana*, L.

Mr. T. R. Billups exhibited a fine series of the very rare British beetle, *Medon* (*Lithocharis*) *piceus*, Kr., taken from a heap of weeds and vegetable refuse in the neighbourhood of Lewisham on May 19th; and specimens of *Actebius signaticornis*, Rey, and *A. villosulus*, Steph., taken in company with the above. Mr. Billups also exhibited specimens of *Eulophus damicornis*, Kirby, belonging to the family *Cynipidæ*, bred from pupæ found by Mr. Adkin attached to the leaves of lime trees at Oxshot, Surrey, but the host was unknown.

Mr. W. F. Kirby read a paper entitled "Descriptions of new species of *Scoliide* in the collection of the British Museum, with occasional reference to species already known.

Mr. J. B. Bridgman communicated a paper entitled "Further additions to the Rev. T. A. Marshall's Catalogue of British Ichneumonidæ."

Mr. J. S. Baly communicated a paper "On new species of *Diabrotica* from South America."—W. W. FOWLER, *Hon. Sec.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

June 20th.—Mr. HUCKETT, Vice-President, in the chair. Mr. Trew was elected a member of the Society. There were numerous exhibits, comprising the following lepidoptera: Mr. Hockett, a series of the Shetland form of *Eupithecia venosata*, and specimens of *E. togata*. Mr. Manley, *S. ligustri* and *A. villica*. Mr. Battley, *E. albulata*, *A. luteata*, *flavalis*, and *prunalis*. Mr. Bellamy, *S. ocellatus*, *C. elpenor*, and *A. rumicis*. Mr. Boden, three specimens of *L. hexapterata*, and an extraordinary var. of *V. maculata*. Mr. J. A. Clark, specimens captured at Epping Forest after the rain on June 7th. Mr. Hollis, a very fine *S. populi* bred from ova. Mr. F. Milton, three specimens of *Bombyx callunæ*. Diptera, &c.: Mr. P. W. Jarvis, the following from Hackney Marshes: *Helophilus trivittatus*, *H. lineatus*, *H. lunatus*, *Syrpitta pipieus*, *Rhingia rostrata*, *Rhyphus cinctus*, *Eristralis rupium*, *E. intricarius*, and *E. sepulchralis*. Mr. F. Milton, a specimen of the Snakefly. Mr. Clark mentioned that Dr. Sequiera also had taken a very fine fly of the same genus at the New Forest last year. Coleoptera: Mr. Battley, *Clytus arietis*. Mr. Boden, *Cryptocephalus hypochaeridis*, &c. Mr. Heasler, *Gnorimus nobilis*, from Loughton. Mr.

Jarvis, *Platytarsus setulosus*, from Hackney Marshes. Mr. Lewcock, a long series of *Malachius aeneus*, a very small *Liophlæus nubilus*, and *Tillus elongatus*, from Chattenden. Mr. Cripps' box contained a fine specimen of *Anthrribus albinus*, also from Chattenden. Mr. Jarvis also exhibited several fossils, including a crayfish from Felixstowe. Several members commented on the abundance of certain species of insects at Epping Forest and elsewhere.

July 4th.—Mr. HUCKETT, Vice-President, in the Chair. Mr. Heasler was elected a member. Mr. May exhibited a long series of *Phorodesma smaragdaria*, bred this year from larva taken on the Essex Marshes. Mr. Clark, a series of *Retinea resinana*, also exhibiting numerous twigs of Scotch fir, showing the manner in which the larvæ fed. Mr. Hockett, several species taken at Epping Forest during the previous week; *Angerona prunaria*, *Pericallia syringaria*, &c., also *Toxocampa pastinum*, bred from a larva taken at Chattenden by Mr. Lewcock, May 25th. Mr. Gates a fine series of *Abraxas grossulariata* containing several varieties. Mr. Hanes, *Arctia mendica* and *Leucophasia sinapis*. The following were the most noticeable in the exhibits of coleoptera: Mr. Newbery, *Stangalia melanura*, from the New Forest. Mr. Hanes, *Clythra 4-punctata*, *Caloroma inquisitor* (taken at sugar), *Strangalia melanura* and a number of other species, all from Brockenhurst. Mr. Heasler, *Opilo mollis*, from Bromley, Kent, *Telephorus abdominalis*, from Loughton. Mr. Lewcock, series of *Campylus linearis*, from Chattenden. Messrs. Jarvis and Milton also exhibited.—G. A. LEWCOCK, E. HANES, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

June 27th, 1889.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Mr. Joy exhibited *Bankia argentula*, from Cambridge. - Mr. Wellman, *Penthina pruniana*, var. *pullana*. Mr. Dennis, a variety of *Argynnis selene*, the black markings of the fore-wings forming a broken band across the wings, from Ashdown Forest. Mr. R. Adkin, *Lobophora hexapterata*, bred from larvæ taken in W. Yorkshire. Mr. Tugwell said this was not by any means an uncommon species, he had found it in Berkshire, at Tilgate Forest, and near Hailsham; the larvæ was peculiarly an aspen feeder. Mr. Strong, *Scodiona belgiaria*, a variety of *Bupalus piniaria*, and larvæ of *Liparis monacha*, from the New Forest. Mr. Waller, a fawn coloured variety of *Argynnis euphrosyne*. Mr. Frohawk, some British spiders and their nests. Mr. Billups, *Eulophus damicornis*, bred from pupa attached to the leaves of lime trees, from Ox-shot; a specimen of *Schirus dubius*, taken by Mr. Carrington, at Horsley, Surrey, this being a new locality for the species, it having hitherto been recorded from the Isle of Wight, Portland, and Pangbourne; a series of *Corymbites quereus*, var. *ochropterus*, taken at Armagh, Ireland, by the Rev. W. F. Johnson; also galls on the Dead Nettle (*Lamium purpureum*), and the parasite *Torymus abdominalis*, bred from the same, the galls were found in the neighbourhood of Westerham.

July 11th, 1889.—The President in the chair. Mr. Weir exhibited a specimen of *Panarge egeria*, taken by Dr. Percy Rendall, at Puerto Ventura, one of the Canaries; it was apparently the variety *Xiphia*. Mr. West (of Streatham), speci

mens of *Cidaria dotata*, with dark banded variety taken in his own garden. Mr. J. A. Clark, specimens of *Retinia resinella*, and Mr. Tugwell made some remarks upon its curious habit of feeding, and making its cocoon in resinous matter. Mr. Turner, a remarkable albino decoloration of *Melanippe fluctuata*. Mr. Adkin, *Spilosoma mendica*, var. *rustica*, bred from selected parents, the offspring largely following their respective parents; also larva and pupa of *Gonepteryx rhamni*. Mr. N. E. Warne, *Cænonympha davus*, from Cumberland; it was remarked that like most English specimens it differed on the underside from the unicolorous Scotch forms. A discussion ensued on Melanism, Messrs. Weir, Tugwell, and Slater taking part. Mr. Weir, leaves of *Urtica dioica*, with a number of dead flies attached, which were surrounded by a fungus; Mr. Billups considered they had died from an internal parasite. Mr. Billups, clusters of flies *Anthrax ibis*, with parasites of the genus *Encyrtus*; also *Orgilus obscurator*, bred from larva feeding on sawfly; also *Apanteles ruficornus*, in cocoon, in remains of its host (*Diloba cæruleocephala*), and made remarks on the variety of its hosts, besides the above, *Leucania littoralis*, *Spilosoma menthastri*, *Leucania pallens*, *Collia sparsata*, *Agrotis præcox*, were mentioned. Mr. Tugwell, stems of *Salix repens*, with what appeared to be galls closely resembling in appearance the berries of *Vaccinium*.—H. W. BARKER, Hon. Sec.

A Day's Collecting on the Banks of the River Yarra, Australia.

By ERNEST ANDERSON.*

Starting about 8.30 a.m. from my house, on December 24th, 1888, I took train to the city, and, arriving there in about ten minutes, got on one of the very excellent cable trams, which soon whirled me to the banks of the River Yarra. Here I met by arrangement some friends, and we took a fast outriggered boat. Putting our provisions and impedimenta into the stern, we pointed the boat's head upstream, and with light hearts and lusty arms set off upon our day's pleasure and collecting.

The banks at this spot are very pretty. On the one side it rises abruptly to a great height, being covered with gum trees and wattles, while opposite, a fringe of willows, wattles, and various species of tea tree, hide from view the flat meadows overgrown with long grass and rushes. As we pulled up the sluggish and muddy river, swollen by recent heavy rains, we could not but notice the thousands of *Libellula*, comprising several species, which kept settling on our oars, the boat, and ourselves; while ever and anon, bright brown butterflies

* A Paper read at the meeting of the City of London Entomological and Natural History Society, May 16th, 1889.

would appear against the dark foliage. These were *Lassiomata merope*, a species of *Satyus*. There were also large numbers of a somewhat smaller species, *Xenica achanta*, which has a very beautiful underside; of these I procured a very good series, landing for the purpose, and finding at the same time plenty of a little *Acidalia* flying over the grass.

After several hours pulling we again landed, and two of the party set off for the little village of Alphington, in order to obtain some additional refreshments, and I seized the opportunity to have a vigorous foray among the herbage and brushwood. I was soon rewarded by starting some very pretty "carpets," something like the English *Coremia ferrugata*, and also one which is like the Phoenix (*C. suffumata*) as regards the fore-wings, but has the hind-wings of a bright orange colour. On the gum trees I noticed several large oval cocoons resembling those of *D. vinula*, but considerably more conspicuous than the latter species generally are. For some time I could not find any but empty ones, but after a little perseverance I managed to secure about two dozen heavy full ones. Upon showing them to my companions they told me that they were what the locusts came from; but upon cutting one open I found the enclosed pupa belonged without doubt to the lepidoptera. I subsequently bred a very fine series of *Antheræ eucalypta* from the cocoons; it is a beautiful species of the *Saturnia* type, in fact the larva is like an overgrown *Carpini*, but they do not produce silk. While examining the wattle trees, I noticed that most of them were terribly infested with internal feeders, and after a short time I was fortunate enough to find a perfect specimen of the species which was doing the mischief; it was a fine fellow just emerged, and measures $5\frac{3}{4}$ inches across the wings—the insect bears a very general resemblance to *C. ligniperda*, but is larger. One of the most interesting features to me was the number of cases of *Psychidæ*, which were to be found on almost every tree, of these there are three species, but so far I have only been able to rear two, though I have the third species still feeding. All of them have transparent, or nearly transparent wings, and the females are simply like large white maggots, having no legs or wings, of course they do not leave their cases, but the males come to them.

But to return to our party, for shouts announced the return of the foragers, bringing amongst other things the welcome treat of some bottles of English ale, and we were soon discussing the good things, while our thoughts and conversation turned upon the "old country," and the very different condition of things in general over there at that

time of the year. As we lay on the grass, talking, and lazily smoking, beneath the somewhat scanty shade of a large blue gum, an "Animated Stick" (*Phasma* —sp.?), dropped upon one of us and caused considerable amusement. The rapidity with which these ungainly looking insects move is indeed marvellous, and one can get no proper idea of their real appearance from the dried specimens seen in museums and cabinets.

Flying round the sweet white blossoms of the tea-tree scrubs were large numbers *Agarista glycina*, a pretty day-flying species of the Tiger moth, of a deep black color with yellow markings. In the larval state they are very destructive to grape vines, being fond of eating the young shoots and stems, thereby causing the destruction of the fruit. The larva, though different in shape and marking, much resembles *C. verbasci*, with the addition of a pink blotch at the anal extremity, they only have a few scattered hairs upon them, looking more like a noctua larva, but the moth is a true Bombyx.

Flying among the *X. achanta* were a few of an allied species, *X. Klugii*, which is almost identical above but very different on the underside; while a rather dull looking "Blue" (*L. alsulus*) was fairly abundant, flitting over the long grass, from which started at every moment large numbers of *Crambidæ*, some of them very pretty, being striped with silver, and somewhat similar to *C. Warringtonellus*; there are a large number of this family here.

Feeding on the wattle, which is to insect life here what the oak is in England, I found some Bombyx larvæ somewhat resembling *A. caja*. These spun up very shortly afterwards, forming an oval cocoon, thickly covered with short hairs, which have the most acute urticating properties that I have yet observed, for after handling these cocoons it took me about an hour to extricate the hairs from my hands. The moth proved to be *Lælia Australasiæ*, a species of the *Bombyx rubi* type. A few large *Agrotis* and some very black noctuæ (*Mamestra niger*) were picked off the trunks of some large gums, and I also took a beautiful specimen of *Heliothis armigera*.

This concluded the day's work, and though not a very big catch, it was a very pleasant outing. On the way back a large brown snake swam across the river just in front of the boat, but we thought it best not to interfere with him, as there are some very venomous ones here.

The Pterophorina of Britain.

By J. W. TUTT, F.E.S.

(Continued from page 166.)

PTEROPHORI.

The *Pterophori* form a very distinct group of moths, but so far as is at present known, they form one of the smallest families in point of numbers. The British species of the group are divided into three sub-families: (1) *Chrysocorididæ*, (2) *Pterophoridæ*, (3) *Alucitidæ*. The total number of British species in the *Pterophori* amounts to 33 (Stainton mentions 31, including *Chrysocorys*, *festaliella*, and *Alucita hexadactyla*), of which one species—*cosmodactylus*—is by Herr Wallengren considered a variety of *acanthodactylus*; one—*brachydactylus*—appears to be very rare; and another—*hieracii*—is very rare or otherwise little known. Only one species is referable to the *Chrysocorididæ*, and only one to the *Alucitidæ*, the remaining species being placed in the *Pterophoridæ*.

CHRYSOCORIDIDÆ.

This sub-family contains only one European genus, and was formed for the reception of this genus, *Chrysocorys*, when it was removed from the *Tineina* and placed with the *Pterophori*.

Chrysocorys, Curt.

This genus is thus characterised by Stainton, in his "Manual," vol. ii., page 402: "Imago, antennæ hardly longer than the body, rather thick; palpi moderately long, rather curved, slender, pointed; forewings narrow, with the costa almost retuse, but convex before the tip." It contains only one British species—*festaliella*—and this is also the only European species, although other members of the genus are found in North America. The genus was previously placed by authors in the *Elachistidæ*, in which position it may be found in Stainton's "Manual." Herr Wallengren first removed it to the *Pterophori*.

C. festaliella, Hb. In the catalogue of Drs. Staudinger and Wocke, 1871, this species is placed in the *Elachistidæ* under the generic name *Sehreckensteinia*, Hb., between the species *Staintonia medinella*, Stdgr., and *Heliodines ræsellæ*, L.

IMAGO—The description of the imago in Stainton's "Manual," Vol. II., page 402, is as follows: "6". F.-w. bronzy-yellowish green, with a dark fuscous line along the fold and hind margin, and another

on the disk running to the tip of the wing. V.VI." With regard to the time of appearance of this species, Mr. N. M. Richardson, M.A., writes:—"I think there must be two or three broods in the year, as the larvæ I obtained in October 1887, became imagines on May 5th, 1888. I saw the imagines flying this year, last week (first week in July, 1889) at Portland, and the larvæ I obtained in October would probably be the offspring of moths emerging in August or September, so that I assume there are emergences in May, July, and September (or August), but this is only theoretical." (in litt.) Merrin's "Calendar" gives V-VI. and VIII. as the months of emergence for the imagines.

LARVA—"Pale green, bristly; the spots glassy. On the underside of leaves of bramble and raspberry" (Stainton's "Manual," page 402). Mr. Richardson again writes:—"I found full-fed larvæ of *C. festaliella* on October 26th, 1887, feeding on the *upper* surface of bramble leaves, and only eating the upper portion of the leaf. The larvæ seem to ramble about a good deal from one leaf to another, so that one sees a great many traces of feeding but not many larvæ. The larva is green and hairy, and very like a plume larva in style" (in litt., 1888). I would direct attention to the fact that whilst the "Manual" says "under surface," Mr. Richardson found larvæ feeding only on the "upper surface" of the leaf. In the "Entomologist's Annual" for 1856, p. 57, Mr. Stainton writes:—"Mr. T. Wilkinson, of Scarborough, sent me in September some larvæ of this species, and subsequently I found them at Bideford rather commonly. They feed either on the upper or underside of bramble-leaves, eating the leaf half through and making conspicuous blotches, which are very evident, even when you are not specially looking for them. The larva agrees well with Hübner's figure, which is copied by Curtis." The larva may be found in June, August, and again in October. The food plants appear to be raspberry and bramble; in Merrin's "Calendar," page 116, honeysuckle is given as food-plant, but both Messrs. C. G. Barrett and Dr. Jordan doubt the occurrence of the larva on this plant.

PUPA—The larva spins a cocoon, which is very beautiful. It is oval and composed of a fine network of threads; these threads are stiff in substance somewhat like those in a cocoon of *Cerura vinula*" (Mr. Richardson in litt.)

This species is common in many parts of Britain, occurring in Kent and almost all the Southern Counties, extending its range into the Lake District, and since it occurs in Scandinavia probably occurs

in Scotland. It has a very extended range both on the Continents of Europe and America. It has been recorded from Corsica by Herr Mann, "*Tineina of Southern Europe*," p. 120; and also from Oregon by Lord Walsingham, "*Entomologist's Monthly Magazine*," Vol. XVIII., p. 73.

PTEROPHORIDÆ.

This sub-family comprises almost all our British "Plume" moths, and the species are at present divided among eleven genera, viz:—*Agdistis*, *Cnæmidophorus*, *Platyptilia*, *Amblyptilia*, *Oxyptilus*, *Mimæscoptilus*, *Ædematophorus*, *Pterophorus*, *Leioptilus*, *Pselnophorus*, and *Aciptilia*. Two species appear to me to be much misplaced in the genera in which they ordinarily appear, viz: *phæodactylus* in *Mimæscoptilus* and *paludum* in *Aciptilia*. All the British genera in *Pterophoridae* have the anterior wings divided into two lobes, and the posterior wings into three plumules, except *Agdistis*, in which genus the wings are undivided. and it is worthy of notice that the American genus *Scoptonoma* exhibits the same peculiarity. Stainton thus characterises the group: "The essential character of the group is that the fore-wings are slightly or deeply cleft, and that the hind-wings are split almost in their entire length into three distinct feathers. The larvæ have 16 legs and are rather hairy. They form no cocoon, but fastening themselves by the tail to a leaf or stem, they shed their larva-skins and appear in the pupa state. Some of the pupæ are nearly as hairy as the larvæ, others are quite naked" (Stainton's "Manual," Vol. II., p. 439). These general characters hold good, although *Agdistis* has undivided wings, and some of the species do make loose cocoons to change into the pupal state.

Agdistis, Hb.

This is the genus *Adactyla* of Stainton's "Manual," which is characterised "by the undivided wings." The cleft of the anterior wings of the *Pterophoridae* are wanting, but the point on the edge of the wing where it should occur is without a fringe, the posterior wings are not divided into plumules. It is a very restricted genus, and contains but one British species, *bennetii*. Dr. Staudinger gives eight species as inhabiting the European area, while the genus is apparently very rare in North America, where is found the closely allied genus *Scoptonoma* which differs from *Agdistis* in having no naked fringeless space where the cleft of the anterior wings normally occurs in the group.

(To be continued.)

Notes and Observations.

NEST OF NUTHATCH.—In reply to Mr. Warner's question on early nesting, in the *Young Naturalist* for June, I have made further enquiries as to the species, and have seen the place where the nest was found. It was certainly the Nuthatch (*S. europæa*) as Mr. Warner suggested, and not the Nutcracker (*N. caryocatactes*) as I stated. I am sorry I was led into such an error.—D. H. STUART, Radley College, Oxford.

THE QUAIL AT HARTLEPOOL.—I picked up a specimen of the Quail on 4th July, close to the town. It was very much exhausted, and died very shortly after I found it. It is the first I have seen here.—J. J. CAMBRIDGE, Hartlepool.

APATURA IRIS AT WELLINGBOROUGH.—I have just had the pleasure of taking for the first time a fine male *Iris*. This makes the thirty-fourth species of butterfly I have taken myself in this neighbourhood. I think this is a very fair proportion to be taken in a locality that has not a wood nearer than four miles; yet within that distance I have taken thirty-one species, and the other three with eight miles.—J. BATES, 10, Orchard-terrace, Wellingborough.

SPHINX CONVULVULI AT HARTLEPOOL.—The first *Convulvuli* of the season was brought me to-day by Mr. Thirlwall.—JOHN GARDNER, Hartlepool.

SPHINX CONVULVULI.—On August 24th a *S. convulvuli* was brought me. It was much the worse for rough handling but was probably a good specimen when captured. It was found at rest on some palings in Southampton.—HERBERT ASHBY, Southampton.

CHÆROCAMPA PORCELLUS AT OXFORD.—As I was walking along one of our passages this morning, I saw a large moth settled just above one of the windows, and upon securing it found it to be a freshly emerged specimen of *C. porcellus*. It is sometime since I heard of the species occurring here.—D. H. STUART, Radley College, Oxford.

ZYGÆNA LONICERÆ WITH CONFLUENT SPOTS.—This species rarely occurs with confluent spots. I have this year bred a rather curious form from some pupæ kindly sent me by Mr. J. Walker, of York. Of the basal spots, that nearest the costa forms a long streak, extending beyond, but not confluent with the outer spots of the central pair. The inner basal spot is connected with the inner spot of the central pair, on the left wing only, by a suffused streak. The outer central

spot is similarly connected with the fifth spot, also on the left wing only. On both wings the fifth spot is extended towards the anal angle considerably further than usual. Altogether it is a very pretty and peculiar specimen.—JOHN E. ROBSON, Hartlepool.

TRIPHÆNA SUBEQUA.—During the last week of July I caught no less than fifteen specimens of *Triphæna subequa*; they varied in colour from chestnut brown to olive grey.—D. H. STUART, Kilmorack Manse, Inverness.

PACHYCNEMIA HIPPOCASTANARIA.—I took several of these moths in August this year; they were in good condition and apparently fresh from the pupa. Would not they be a second brood, for I have seen none since the early part of June and those were much worn?—HERBERT ASHBY, Southampton.

TORTRIX PICEANA RE-CAPTURED.—I have pleasure in recording the capture of *Tortrix piceana*, by Mr. Charles Gulliver, Ramnor Cottage, Brockenhurst. This is the more gratifying as acting on the advice of the best entomologists in the country, he had devoted a great deal of time in searching for the larvæ, but without success. Those who wish specimens of this rarity will do well to send to him at once, as he has only a few specimens.—S. J. CAPPER, Huyton Park, Liverpool.

CAPTURES IN THE ISLE OF WIGHT.—I had a little sport with *Spilodactylus* the other day, and have taken a good many *Bennetii*. No noctuæ, they *wont* come; the sugar is wasted. Small things are abundant, but I have scarcely met with anything out of the way. I got a nice lot of *C. parvulana*.—J. W. TUTT, Roseberry House, Freshwater Bay, Isle of Wight.

NEBRIA GYLLENHALII.—Having taken this beetle for some years at an altitude of over 1,000 feet, I was considerably surprised the other day to find it beneath the bark of a rotten willow stump, not 300 feet altitude. It not this unusual? I generally capture them by pulling up likely tufts of *Eriophorium vaginatum* (cotton grass), and shaking them well over a newspaper, and have also found them by turning over pebbles in the bed of a dried up mountain stream.—C. E. STOTT, Lostock, Bolton.

Nebria Gyllenhalii occurs in Crimdon Dene, three miles from here, very little above the level of the sea. I find it under stones at the edge of the little stream that runs down the Dene, or in hot weather when the stream is dry, under stones in the bed.—JOHN E. ROBSON, Hartlepool.

RHYNCALUS GRACILUS AT MANCHESTER.—On the 10th of March, my son Joseph brought to me a piece of timber which had been a portion of a manger, which he found on a dung heap at Greenheys. It was evidently infested with insects, as the numerous burrows testified which were visible on its surface; on investigation, I found about fifty of the above species in its interior, in various stages, viz.: larvæ, pupæ, and perfect beetles. I have put a portion of the infested timber in tin boxes in hopes of breeding this rare British species.—JOSEPH CHAPPELL, 29, Welbeck Street, Manchester.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

August 7th, 1889.—The Right Hon. Lord WALSINGHAM, M.A., F.R.S., President, in the chair.

The Rev. John Walley, of Wuhu, China, was elected a Fellow; Professor Chas. V. Riley, of Washington, United States, was elected an Honorary Fellow in place of the late Dr. Signoret, of Paris; and Colonel Swinhoe and the Rev. F. D. Morrice were admitted into the Society.

Mr. Walter F. Blandford exhibited a specimen of *Cardiophorus cinereus*, Herbst, taken at Tenby, and remarked that the species had rarely, if ever, previously been found in the United Kingdom. Mr. C. O. Waterhouse said he believed that there was a specimen in the collection of his late father and also another specimen in the collection of the British Museum.

Mr. Waterhouse stated that the British Museum had just received from the Rev. Arthur Elwin, of Hangchow, China, a luminous larva about $1\frac{1}{2}$ inches long and $3\frac{1}{2}$ lines broad, which he believed to be one of the *Lampyridæ*.

Lord Walsingham exhibited specimens of *Conchylis degreyana*, M'Lach., bred from seed-heads of *Plantago lanceolata* at Merton, Norfolk; also a specimen of *Tineidæ* allied to the genus *Solenobia*, probably belonging to *Dissoctena*, Staud., but differing somewhat in the structure of the antennæ. Lord Walsingham remarked that the specimen was taken by himself at Merton on the 31st July last, and that the species was apparently undescribed.

Mr. Meyer-Darcus exhibited a collection of Coleoptera, comprising specimens of a species of *Loethrus* from Turkestan, *Fulodis globithorax*, Stev., from the Caucasus, a new species of *Fulodis* from Kurdistan; *Cardiaspis Mouhotii*, Saunders, from Sikkim; *Carabus smaragdinus*, Fisch., from Siberia; *Fulodis ampliata*, Mars., from Aintab, Asai Minor, and a variety of the same from Kurdistan; and *Fulodis luteogramma*, Mars. from Syria, and a variety of the same from Kurdistan.

Mr. H. Goss read extracts from letters from Mr. R. W. Fereday, of New Zealand, and Sir John Hall, K.C.M.G., relating to a number of Lepidoptera recently collected

by the latter at sea, about half way between the River Plate and Rio, at a distance of over 250 miles from land, in about 30° S. lat. and 46° W. longitude. It was stated that the ship was surrounded by swarms of moths. Mr. J. J. Walker, R.N., observed that he had seen a large number of insects at sea about 150 miles off the coast of Brazil, and he referred to other records of the capture of insects at sea in Darwin's "Voyage of the Beagle," and Dr. Carpenter's "Cruise of the Alert." The discussion was continued by Dr. Sharp, Lord Walsingham, Mr. White, Mr. Kirby, and others.

Mr. E. Meyrick read a paper entitled "On some Lepidoptera from New Guinea," and exhibited the species described in the paper. He stated that the specimens were derived from two sources, *viz.* (1), a portion of the collection received by the Society from Baron Ferdinand von Müller, F.R.S., and collected by Mr. Sayer when accompanying the Australian Geographical Society's Exploring Expedition; and (2), a number of specimens collected by Mr. Kowald near Port Moresby, and obtained from him by Lord Walsingham.

Mr. Blandford read a letter from Mr. Wroughton, of Poona, Deputy Conservator of Forests, asking for assistance in working out certain Indian Hymenoptera and Diptera in the collections of the Bombay Natural History Society. Lord Walsingham, Colonel Swinhoe, and Mr. Moore made some remarks on the subject.—H. Goss, *Hon Secretary*.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

July 25th, 1889.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Mr. R. South exhibited a fawn-coloured var. of *Argynnis adippe*, the black spots being represented by semi-hyaline spots; also two vars. of *A. euphrosyne*; the var. of *A. adippe*, and one of *A. euphrosyne* were received from a correspondent in Kent. Mr. West, specimens of *Apamea ophiogramma*, taken in his garden at Streatham. Mr. R. Adkin, examples of *Selenia lunaria*, *Fidonia piniaria*, *Amphidasys betularia*, and *Odontopera bidentata*, bred from larvæ and pupæ received from Forres. Mr. Frohawk, pupæ of *Gonopteryx rhamni*, and called attention to their resemblance to a young bird, also living larvæ of *Nemeobius lucinæ*. Mr. Wellman, bred series of *Sesia tipuliformis*, *S. myopiformis*, *S. formiciformis*, and *S. musciformis*, the last named bred from pupæ from the Isle of Man. Mr. Auld, three specimens of *Callimorpha hera*, var. *lutescens*, bred from ova obtained from a female of the var. taken in Devon, 1888. Mr. J. T. Williams, an example of *Arctia caja*, the red colour of the inferior wings being replaced by orange. Mr. T. R. Billups, six out of the seven species of Social Wasps indigenous to this country, *viz.*—*Vespa crabro*, *V. vulgaris*, *V. germanica*, *V. rufa*, *V. sylvestris*, and *V. norvegica*, and read notes relative to his exhibit. Remarks were made by several members on the failure this year of sugar to attract moths, and a discussion as to the cause of this ensued. Mr. Rice, eggs of Stonechat (*Pratoncola rubicola*), found in Surrey, and a nest and eggs taken on the edge of a cornfield. Mr. Weir thought these eggs were those of a Grasshopper Warbler (*Locustella naevia*). Mr. Henderson did not agree.

August 8th, 1889.—The President in the chair. Mr. Dawson exhibited a specimen of *Deilephila livornica*, taken in the neighbourhood of Plymouth, 1888, a melanic form of *Taniocampa instabilis*, taken at Plumstead, and two vars. of *Polyommatus phlas*, one being the var. *Schmidtii*, taken at Plumstead. Mr. Carrington knew of three or four examples of this var. having been taken during the last ten or fifteen years. Mr. Tugwell remarked that he did not altogether agree with Mr. Carrington, that the var. *Schmidtii* was so rare, he thought that in nearly all the principal collections there were forms approaching this variety. Mr. Carrington, in reply, said he only knew of four such as the one exhibited. Mr. Dennis, forms of *Bryophila perla*, including several yellow specimens and one having the superior wings almost entirely suffused with black. Mr. R. Adkin, a specimen of *Chaerocampa porcellus*, bred from a larva found last year and which was put in a box without any earth and had spun a cocoon some way from the bottom of the box within which it pupated. Mr. Joy, a var. of *Epinephele hyperanthus*, having the spots on the under side unusually large. Mr. Turner, a larva of *Dicranura vinula*, affected by some disease which Mr. Tugwell said appeared to be of a fungoid nature. Mr. Billups a female example of *Bracon roberti*, taken in his garden at Peckham, also series of *Ascogaster varipes* (both sexes), and *A. instabilis*, and read notes; also galls on *Salix herbaceæ*, and their maker *Nematus herbaceæ*. The Secretary, on behalf of Mr. T. D. A. Cockerell, two galls found at West Cliff, Colorado, on the wild rose, one *Rhodites bicolor*, and the fly bred from the other, Mr. Cockerell proposed to name *Rhodites rosæfolii*. A communication was also read from Mr. Cockerell on "Bees and Poppy flowers." Mr. Hall mentioned that below Reading he had seen an albino specimen of the Sand Martin (*Cotyle riparia*).—H. W. BARKER, Hon. Sec.

[The Report of the City of London Society has been lost in transmission.]

Publication Received.

The York Catalogue of British Mosses.*

We have received a copy of this neatly printed and carefully arranged pamphlet. It will prove an invaluable aid to collectors of this humble, and hitherto rather overlooked branch of our native Flora. The great increase in the number of species and varieties noted of late years, shows what an ample field there is for industrious search in this lowly but attractive branch of botany. It is notorious how enthusiastic moss collectors become, and this brochure will prove a ready means of introducing their wants and wishes to each other. To the young devotee, the absence of a census table to denote the comparative rarity or frequency of a species, will be rather a drawback, as he is thus furnished with a ready means of appraising the relative value of his "find." But this is an omission that Mr. Wheldon looks forward to being remedied at no distant date, and in the meantime all who wish to interchange specimens of mosses will find his list of incalculable service.

*Compiled by J. A. WHELDON, A.P.S., Hon. Sec. York Field Naturalists' Society.
Ben Johnson & Co., York.

Microscopical Notes.

By CHAS. H. H. WALKER.

Saturday, May 25th, from being dull in the early morn, held forth, at a later hour, such promise of a fine day, tempered by a grateful breeze, that we hastily filled two bags with sundry boxes, bottles and tubes, which equipment—aided by a couple of nets, the one for insects and the other for water—was calculated to meet such requirements as the exigencies of the chase might call for. The Rock Ferry steamer brought us to the commencement of our journey, and it was but a short walk of about half-a-mile along the river wall to the New Ferry. Here, on the south side of the iron pier, lies the leviathan hulk of the most famous ship that ever sailed the seas—the “Great Eastern”—dismantled, dull, and dirty. And this is the last of Brunel’s great masterpiece: after a chequered career of inutility, after the performance of but one act that justifies the gratitude of two nations, after having fortunes squandered upon her, to await the disruptive hammer on the foul mud of a river upon whose broad bosom she has so often rested, the cynosure and wonder of every eye. And so will she vanish from the mind of man, while other and mightier structures will come and go, and, like her, leave but a memorandum in the book of time.

Decidedly this is a season for flies, and housekeepers will have to do systematic battle with the bottle of cerulean hue, otherwise the *Musca vomitoria*, alias the maggoty fly; for here, on every roadside hedge, they reign rampart. If our Lancashire entomologists bewail the absence of moths, verily they shall see a plague of flies of another sort.

And here, also, mingling with the common herd, is *Musca Cæsar*, with its shining suit of green; and there a little ichneumon, whose maternal instinct is prompting it to seek gratuitous board and lodging for its—as yet—unborn young, whisking its lithe antennæ about with a wicked celerity that bodeath but ill for some unlucky wight of a caterpillar.

Half-past three o’clock, and here we are loitering already! Come, hurry along, if we are to reach our destination this day! Past the white turnpike, through the crowd of Saturday loungers that the “house of call” at the corner everywhere attracts, and adown the New Chester Road that stretches straight before us in an undulating line. Bless us! look at the swirling clouds of dust, and how hot, and red, and foggy the cyclists look as they dash past, and disappear in

the cloud left by the last retiring vehicle. Well, it is a comfort to know we will have this in our backs on our homeward journey.

"*Halte la.*" There must be a pit about. Look how the trees hang and droop, and try, as it were, to wash their dusty leaves in the water. It is green and rich, and it smelleth of the earth, earthy. The grass is rank and long, and the nettles sting—oh, how they sting! Positively these herbs reek with venom when they draw their juices from a pit's damp banks. A dip with the bottle beneath the duckweed shows a variety of animal life. Some minute, filmy tufts on the stalks and undersides of the leaves of the *Lemna*, will prove to be vigorous colonies of *Vorticellidæ*, doubtless *V. nebulifera*, one of the most common of the infusorian animalcules. The water is alive with entomostracous crustaceans, and we recognise with the unaided eye, *Cypridæ*, sundry individuals of the order *Copepoda*, in the shape of *Cyclops*, with its two egg masses, which look like panniers on either side, and *Daphnia pulex*, the lively little water-flea. The net brings up from the bottom some larvæ of the caddis-fly, in their tubes of sticks and twigs, all angles and corners; they are easy to breed, and shall go home, to take their chance with a multitude of other things.

Just before we cross the stone bridge over the pool, it is well to make a stoppage at the pits on the left, and notwithstanding the conspicuous notice that wanderers on these forbidden grounds will receive condign punishment—if caught. We tumble over the barbed fence at a point where some thoughtful hand hath removed the barbs, like molars from an aching jaw. And we just missed clapping a foot into a nest, not half a span from the footpath, in which reposed three tiny eggs, that looked as though a spider, with dirty feet, had been endeavouring to trace its geographical knowledge thereon. And the species? you ask. Indeed we do not know, for, even as thou, oh enquiring one, hath passed through the successive stages of green incipency, so also, has our ornithological knowledge progressed little beyond the profound learning necessary to accurately determine whether our neighbours' fowls or a prowling cat are responsible for the damage done to a favourite patch of *Nicotina affinis*.

Our eyes are not so full of dust but what we can see a most promising morass, full of rushes, with only an occasional reflection of a very blue sky, where the wind has blown the slime away. Just the sort of a place where one would expect to find *Volvox*, and there it is, with the first dip, rolling through the water like a football on tramp. Most interesting atoms they are, with the young plants snugly ensconced within the transparent parental envelope; and we have them

in all stages of life: adults ready to burst, and again start the ball a-rolling, and young *Globators*, spinning about, with the germs of a future generation within *them*. Then the slime is full of *Desmidiaceæ*, of various species, though not visible to the naked eye. *Closterium lunula* and sundry *Micrasteriaceæ* are readily distinguishable with a low power objective. The vivid green of the endochrome, and the delicacy and variety of outline displayed by these microscopic plants, is sufficient to make them interesting objects for study.

Now the pool, Bromboro' Pool, to which reference has already been made, is not fresh water, but a tidal stream, emptying into, and receiving its waters from the Mersey. The Sunlight Soap Company have a wharf here, and their handsome red brick buildings are close by. The tide is out at present, and consequently a large expanse of mud is sweltering under the sun's rays. The hard-baked surface is of a deep olive green, and if we attempt to skin a portion of it off into a tube, at a spot where the tide has just ebbed and left bare, it peels off like rotten paper. This green deposit is Diatomaceous, and these silicious Protophytes, like their more highly developed allies, evolve oxygen-gas freely when exposed to daylight. Some of these sedimentary *Diatomaceæ* are excellent species to introduce into the marine aquarium: they spread with great rapidity, and, during the daytime, will invigorate the vitiated water by a vigorous effervescence.

The road is monotonously long until we come to the stone cross, and diverging at this point to the right, we follow the lane until a duck-pond of fairly large dimensions is reached. Here, in the dense thicket (common) at the back, some profitable sweeping is done, resulting in a net full of gnats, with their lovely pectinated antennæ, formidable probosces and imbricated wings. A quantity of these, supplimented by members of the genus *Psychoda*, are boxed, for with careful and proper treatment, they will make, mounted whole, microscopic objects of great beauty.

On the bridge spanning the railway are a few *Ephemera*, doubtless from the pits in the vicinity. Descending the declivity, a peculiar cottony appearance is noticed on some trees, produced by some species of *Coccus*. Both larvæ and pupæ are present, and the infested trees have suffered no small amount of damage from the attack. A pause is made on the wooden bridge crossing the stream, to notice the clouds of flies performing an endless aërial waltz over the surface of the water. A few minutes busy work with the net secured us some four or five species, supplimented by some very vigorous attentions on the part of the flies. The neck was the principal part attacked, and several huge

blisters bore effective evidence for some days after to the virulence of the bites.

The most interesting captures, and the last of any note, were made at a pond on the top of the hill beyond the meadow. The net brought up quantities of *Ephemera*, larvæ and pupæ, also young larvæ of *Dytiscus marginalis*. These two insects are interesting for the purpose of comparative study, both being purely aquatic in their habits, yet one respiring by means of branchial gills, and the other breathing the external air. Has any one ever discovered the use of the tails of *Ephemera*, beyond their application, during the early period of life, to the projection—it cannot be called swimming—of the insect through the water? We have experienced no difficulty in breeding the imago, and so long as the aquarium is stocked with plants, the larvæ will need no further attention. The pupa is only distinguished by its rudimentary wings, resembling the larva in all other respects. After emergence, the empty pupal envelope will be seen on the surface of the water. The windows of the room in which the aquarium is lodged may be searched for the perfect insect, and attached to the frames will be found the skin of the pseud-imago.

The larva of the newt is also a conspicuous object in the bottle, and we were fortunate enough to take them very young, just after the emergence of the first pair of legs, and before the disappearance of the branchial tufts. In the latter, the circulation of the blood is easily seen with an inch objective, magnifying from 40 to 50 diameters, and, thanks to the excessive transparency of the animal, the pulsations of the heart, and the course of the blood as far as the tail, can be distinctly traced.

Some thirty or forty of the extraordinary larvæ of *Coræthra plumicornis* are also taken, proving a great acquisition to the day's captures. These most singular creatures are apodal, but the head is supplied with an arm-like process, with which its prey is seized and pressed against a pair of cruel dentate jaws. This larva always assumes a perfectly horizontal position in the water, the weight of its body being exactly counterpoised by four air chambers, two thoracic and two pre-caudal.

Nothing particular is noted on the somewhat accelerated homeward journey, which lay through Higher Bebington, unless mention is made of a pit covered with a vivid green scum, composed of *Protophytes* (*Protococcus pluvialis*). No train at Spital for an hour, so walked. Home again at 10 p.m., all dead beat.

Mossy Bank, Egremont, Cheshire.

Obituary.

FREDERICK BOND, F.Z.S., F.E.S.

We much regret to record the death of Frederick Bond, on the 10th August last.

Mr. Bond is perhaps better known to the older naturalists than to the younger race, for his contributions to magazine literature have become fewer in number as his age increased. Like so many more working naturalists Mr. Bond was not much troubled with the *cacoe-thes scribendi*, and never wrote but when he had something to say. We do not remember any lengthy article from his pen, though his short notes of captures and observations, are plentifully scattered through the publications of the last half-century. Mr. Bond was intended for the medical profession, but he did not like it, and, having an independent income, abandoned his studies for more congenial work among the birds and butterflies of his native land. Birds, birds' eggs, and lepidoptera were his favourite branches of natural history, and he confined himself exclusively to British species and British specimens, of which he had amassed a very large and valuable collection, probably one of the best in the country. His knowledge of ornithology was great, and he was a close observer. Scarcely any work on the subject has been published of recent years that did not contain some reference to him. So with lepidoptera. The worst of it is that so much of his knowledge dies with him. Those who had the pleasure of a personal acquaintance with him, or those who, like the writer, knew him only as a correspondent, can testify that he was ever ready to impart his knowledge, but unless the opportunity came he did not seek it.

To ourselves he has been a valued correspondent. Since the *Young Naturalist* was projected he has ever taken an interest in its welfare. The whole of the articles on British birds in the earlier volumes were revised by him, and though his published notes have not been numerous, his assistance to the Editor has always been readily given, and he was pleased to accept the dedication of the second volume.

Born on the 11th February, 1811, he was in his 79th year. He was never married, and lived latterly with a widowed sister. He was one of the old members of the Entomological Society, joining it in 1841. His name will pass down to future generations in connection with *Tapinostola Bondii*, named in his honour by Dr. Knaggs.

The National Collection of British Diptera.

By P. W. JARVIS.

It is some twenty years since the late Mr. F. Walker named and arranged the collection of British Diptera now located at the South Kensington branch of the British Museum. During the period which has elapsed since that time, many alterations and improvements have taken place in the nomenclature and classification of the whole order, and it is high time that public attention should be directed to the very unsatisfactory condition of this valuable collection; more especially as it not unfrequently happens that many students visit the Museum for the express purpose of comparing their specimens of this order with those in the Natural History Collection.

It appears that in Mr. Walker's time but little interest was manifested in the above order, and that we possessed no one of sufficient ability or discrimination to name the species which had from time to time accrued to the nation. That the work which Mr. Walker endeavoured to accomplish was incomplete and inaccurate, has been fully demonstrated by Prof. C. R. Osten Sacken, who made the following observations, respecting his efforts to enlighten the British students thereon:—"Mr. Walker's writings on the order Diptera are not better than his publications on Lepidoptera, Hemiptera, and Orthoptera, as characterized by other authors. The same species are often found described under several different specific names, and placed in different genera; well characterized species of a certain genus are placed in the wrong, sometimes in very distant, genera, or even in the wrong family. In the great majority of cases the descriptions of new species were drawn from a single, often hardly recognizable, specimen; and when new species happen to be represented by more than one type specimen, these are almost sure to belong to different species. Mr. Walker's identifications of the species of former authors are often, I may say in most cases, incorrect."

That Mr. Walker's inaccuracies are not confined to his writings on the subject, can be easily ascertained by any one who cares to investigate the matter, by making a visit to the South Kensington collection of the order Diptera. It is hardly necessary to give a lengthy list of the errors which occur in this collection, and I will limit my observations to two small and clearly defined families, viz.

Simulidæ and Rhyphidæ, which will give a fair idea of the naming, or misnaming, of the whole collection.

The family Simulidæ contains but one genus, *Simulum*. According to the British Museum collection there are eighteen species of this genus, viz.:—*ornatum*, *reptans*, *varium*, *variegatum*, *affinis*, *leutecornis*, *picipes*, *flavipes*, *elegans*, *lineatum*, *marginatum*, *auricoma*, *latipes*, *nigrum*, *cinctum*, *equina*, *sericatum*, and *rufipes*. In Mr. Walker's "Insecta Britannica" (Diptera, Vol. III.), he gives the following as the British representatives:—*reptans*, *elegans*, *marginata*, *lineata*, and *fuscipes*. In the latest list of British Diptera (1888), by Mr. G. H. Verrall, *reptans* and *maculatum* are the only two species of this genus recorded as undoubtedly British.

The family Rhyphidæ is comprised in one genus. In the British Museum the species named are:—*fuscatus*, *fenestralis*, *punctatus*, and *variegatus*. Walker (Diptera, Vol. III.) describes *R. nigricans* and *cinctus*. In Mr. Verrall's list the species set forth as British are:—*R. fenestralis* and *punctatus*; *cinctus* is regarded as doubtful.

I have selected the foregoing as a sample only of the difficulties which students have to contend with, when endeavouring to decide species by comparison with the named specimens at S. Kensington.

Seeing that so many of the British Diptera are misnamed, it would be highly beneficial to the future students of this order, if some one who has studied the British forms would volunteer to re-arrange and re-name the specimens in this collection; and there is no doubt that the British Museum authorities, would be only too glad to afford every facility to any person who might be disposed to undertake the task.

10, Kingsland Green, Dalston, N.E.

On the Wings of Insects.

By CHAS. H. H. WALKER.

(Continued from page 142.)

I have experimentally confirmed this theory of the stridulation of the cricket, if, indeed, we can call anything a theory in which the functions of the various parts are as self-assertive. By removing the tegmina from a dead cricket, and holding them in such a manner that the above conditions are fulfilled, then a rapid frictional movement will give a faint squeak, yet sufficiently loud to be heard in any part of

of a small room. Could we but artificially increase this motion to the speed attained by the living insect, the chirrup would be produced with all its actual power and volume. The silence of the female *Acheta* is owing to the absence of the stridulatory apparatus such as is found to characterise the male.

The increasing length of this paper warns me that I shall again have occasion to dwell upon the subject of sound production at some length, and it will be necessary to leave many orders with little more than bare mention. Such omission must include the interesting group of insects included in the *Heteroptera*, such familiar friends as the Water Boatmen (*Notonectidæ*), Water Scorpions (*Nepidæ*), and Bed Bugs (*Cimicidæ*) being left for a future communication. I will merely remark, *en passant*, that the latter insects have only rudimentary wings, though winged individuals are stated to have occurred; but the fact, if fact it be, needs confirmation.

The *Aphaniptera*, though constituting a too familiar group, are very imperfectly known, as far as regards the functions of certain parts of their structure. They evidently possess a pair of exceedingly rudimentary wings, thus defined by Mr. Westwood: "The mesothorax has a small scale affixed at its hind margin, on each side, behind the coxa of the middle legs, and resting upon the coxa of the hind legs, whilst the metathorax has a much larger pair of these scales, which nearly cover the sides of the first and part of the second abdominal segment." I have not been able to make a necessary and careful comparison between fleas of different species, but as regards *Pulex irritans*, the description seems to me to be somewhat incomplete. The second pair appear to be of a higher development than a mere scale, but in the absence of comparative material, I am unwillingly compelled to pass over this order without further comment.

The anterior wings of Coleoptera are quite useless for flight, the two primordial membranes having become greatly thickened and of a horny texture. They are, as with the generality of true wings, united around their edges and also at numerous points on their inner surface, by horny columns, clearly a survival of the system of hexagonal areolation and consequent adherence of the membranes as before referred to. The hinder pair of wings are, as a general rule, exceedingly well developed, and, not only folded longitudinally, but in those species in which the length of the wing is considerably greater than that of the protective elytra, are likewise doubled over. The wing-cases, or elytra, as they are termed, vary very much in their amplitude, being in some instances very short, as in the *Staphylinidæ*;

in others, some *Carabidæ* and *Curculionidæ* for example, they are soldered together along their inner and dorsal margin, the posterior wings being then absent.

The *Euplexoptera*, or Earwigs, are insects which may be truly said to hide their light under a bushel. To judge from the small and insignificant size of the elytra, one would form a very poor conception of the wonderful wings that they so effectually conceal. When properly mounted for the microscope, they become objects of great beauty, and I found the following method the only one that enabled me to make a satisfactory slide for the purpose of figuring. The wing having been removed at the root, is laid on the surface of some distilled water placed on a glass slip. A touch or two with the needle point will be sufficient, for the wing will spread itself. Cover with another glass, and allow absolute alcohol to trickle between the two, adding it drop by drop every few minutes. In about half-an-hour it will be perfectly dehydrated—stiff and rigid—when it may be transferred to oil of cloves, in which it must be well boiled to expel all trace of air, then mount in Canada balsam. The wing may be said

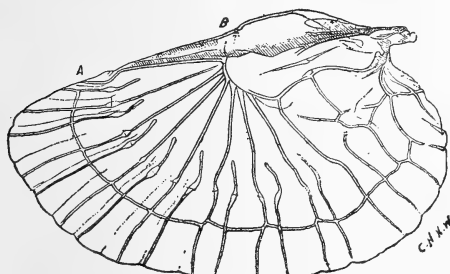


Fig. 17.

to consist of two parts, the lesser and basal portion, which is of a leathery consistence (see Fig. 17, representing one the members of *Forficula auricularia*), and the remainder of delicate transparent membrane. The nervures are of two kinds, radial and transverse. The former branch from a curved ray at B, the latter A runs parallel with the hind margin. A secondary and incomplete series of radial nerves intersect this curvilinear nervure, having blind terminations at the ends nearest the base, but abruptly stopped at their other extremities by the margin of the wing. At first glance it would appear somewhat of an enigma how the insect could stow such a capacious spread of membrane beneath its tiny elytra, but the seeming puzzle is simplicity itself. The wing is first closed up like a fan, then doubled over at the point signified in the figure by the letter A, and again at B, so that the whole structure is thus laid in a neatly folded bundle over the basal portion before alluded to. This all sounds very reasonable, but a moment's reflection will suffice to show that something is wanting. In other words, we have the mechanism, but from whence

comes the power, for there are no muscles to pull it into position? This is accomplished by the aid of the caudal forceps, with which these insects are so formidably armed, for they are employed by the creature to double over and tuck the wings under the elytra.

The *Diptera* possess but two anterior membranous wings, the posterior taking the form of two slender, clubbed organs, termed *halteres*, or poisers (*halter*, a plummet), which vibrate sympathetically with the wings. Owing, therefore, to the almost obsolete nature of the second pair of wings, we must be prepared to find the mesothorax much enlarged, the remaining two, perforce, dwindling to minute and indistinct segments. The fore-wings are frequently provided at their inner margin, and near the base, with small membranous appendages, called *alulæ*, or winglets, but we can only regard them as an extension and modification of the wings to which they are attached.

It will not be out of place to briefly consider the probable part taken by the true wings and their metathoracic representatives in the production of the well-known and equally disagreeable buzz of the fly. By having carefully compared the conflicting opinions of various authors upon the subject, it appears to me that these and other organs individually produce sounds independently of and in combination with each other, the entire aggregation resulting in a continual buzz or hum. De Geer was of the opinion that the sound is evolved by the rubbing or friction of the roots of the wings against the sides of the cavities forming their points of insertion into the thorax. That this is one of the causes there is not much reason to doubt, though it is probable, as I shall hereafter show, that the very conditions of the experiment necessary to prove his theory, remove the possibility of the sound being produced by any other means. Take a specimen of *Musca vomitoria*, the common blue-bottle or meat-fly, and stretch its wings out in opposite directions, holding them between the finger and thumb of each hand. The buzzing continues until they are extended so tightly as to prevent the slightest motion, when it is found to instantly cease. Furthermore, if the wings be cut off close to the base, the sound will continue until they have been plucked out completely.

I have already expressed an opinion that the halteres and the *alulæ* play no important part in the production of this sound. Taking an example from a species of *Tabanus*, it is found that the membranes of the wing become widely separated in the *alulæ*, though still united round the edges, thus forming a species of hollow sounding board, in form like unto a concavo-convex lens. Two drumsticks are supplied

in the shape of the poisers, and I have frequently observed them to beat rapidly on the alulæ during buzzing, thereby undoubtedly helping to swell the volume of sound. A substantial proof of this is afforded by the following simple experiment. Take a sheet of paper and bend it double without absolutely folding it flat, in the likeness of a letter **U**, thus forming a sufficiently accurate model of one of the alulæ. Against it place a tuning fork, which will do duty for a poiser. Now if the latter be beaten against the paper—otherwise the winglet—no buzz is produced, simply because the vibratory blows are not repeated with the necessary rapidity to reach the ear in one continuous sound. But by striking the fork, thereby obtaining a rapid to and fro movement of the prongs, exactly answering to the vibration of the halteres, and permitting the same to come into bare contact with the paper, an excellent imitation of the buzz of an angry fly is the result.

But the winglets are not found in all *Diptera*, and some other reasons must be found to account for the persistence of the sound in such species. The halteres nevertheless remain, and somewhat counterbalance the deficiency by their additional length, though it should be remembered that the noisiest diptera are those provided with alulæ. Dr. Burmeister discovered that the buzz of a species of *Existalis* was continued even after the alulæ, the halteres, and all but the stumps of the wings were removed, but he remarks that the sound was decidedly weaker and higher pitched. A continuance of his researches showed him that the spiracles lying between the meso-and-meta-thoraces, at the base of the halteres were also productive of sound, caused by the forcible expulsion of a stream of air through the same. But in this direction I cannot pursue the subject further, it being the province of the present paper to deal only with the wings of insects—I mention the fact for the sake of completeness.

I had before occasion to remark that the buzz of a fly ceases when it settles. The reason is sufficiently obvious without my referring to it, beyond remarking that the wings are then laid at rest, and accompanying the repose of those organs is the cessation of the vibratory movement of the poisers. This I have found to be invariably the case, unless the wings move the halteres remain stationary; hence the absence of sound when the former are held extended, as before explained.

Observers disagree upon the actual origin of the buzzing of flies, and as there is no reason to suspect that any particular one is correct, and that all others are under erroneous ideas, it appears to me more justifiable to argue that the aggregate or sum of all these causes, com-

bined with the rapid vibration of the wings, are undoubtedly the prime agents in the production of this familiar sound, for it has been found that the intensity is lowered by removing one organ and allowing others to remain.

The actual function of the halteres is very obscure, and numberless uses have been assigned to them. My own experiments tend to show that they have some mysterious affinity with the anterior wings, for if they suffer mutilation, the flight of the insect is sensibly affected. I cut off the left haltera from a specimen of *Musca vomitoria*, but the fly, when released, was then unable to sustain itself on the wing for any length of time; moreover, it flew in a jerky and uncertain manner. When the right haltera was removed in addition, the insect was quite unable to leave the ground beyond a sort of a jump about an inch high, and when dropped from the hand, fell helplessly. They cannot constitute a very vital part, notwithstanding their intimate influence over the organs of flight, as the specimens operated upon lived a week afterwards, partaking of nourishment, but totally unable to fly.

The exact reverse of the *Diptera* is found in the *Strepsiptera*, a group of parasitic insects infesting bees. In these curious creatures, the fore-wings of the male appear as a pair of mesothoracic, twisted appendages, somewhat resembling the halteres of our two-winged friends, and therefore fitly termed *pseudo-halteres*; the posterior organs are large and amply developed. The females are entirely apterous.

* * * * *

In bringing to a close the preceding notes upon the structural variation of such important organs as those to which I have attempted to draw deserving attention, I would wish to express my sincere and grateful thanks to many kind friends who have assisted me with specimens from time to time, and thus materially helped me in the work of figuring some interesting forms. To G. C. Bignell, Esq., of Plymouth, such thanks are more particularly due, for the characteristic and generous manner in which he placed many rare species at my disposal.

Finally, I add the hope that opportunities may not be wanting, to afford me, in the future, material for additional observations upon a subject that I have found to possess the highest possible interest.

Mossy Bank,
Egremont,
Cheshire.

The Pterophorina of Britain.

By J. W. TUTT, F.E.S.

(Continued from page 179.)

A. bennettii, Curt.—

SYNONYMY—*A. bennettii*, Curt. Brit. Ent., X., 471; Stephens' Illus. IV., 370; Wood, 1625.

IMAGO—Curtis not only describes this species but gives an excellent coloured drawing of the imago in his "British Entomology," Vol. X., 471. This figure has ochreous costal and inner margins, a grey, somewhat wedge-shaped area to outer margin, with four black dots on the disc. His original description is:—"Ground colour reddish cinereous, sometimes with an ochreous tint; eyes black, superior wings with four dark spots on each, one towards the base, another nearer the middle, and two beyond it approaching the posterior angle; abdomen of female with five or six pairs of black dots down the back." I find the costa is very rarely sprinkled with ochreous as in the type, and as I had, previous to getting Curtis' description, made out the following one, I append it:—"Forewings entire, much arched near the apex which is pointed; colour, shiny grey, the costal and inner margins much sprinkled with white scales, a line drawn from the apex of the wing to the base of the median nervure, and another from the base to the outer margin (at about one-half between the apex and anal angle) would enclose a wedged-shaped space, much more sparsely scaled than the rest of the wing and not sprinkled with the whitish scales of the costal and inner margins; in the costal area are two or three short blackish streaks and directly along the base of the fold are four black dots stretching longitudinally across the wing, fringe rather lighter and more shiny than the ground colour. Hind wings entire, the same colour as the fore-wings, nervures rather darker, no markings, fringe paler, very shiny, and distinctly marked with a dark line passing through it parallel to the hind margin." Stainton's short pointed description is as follows:—"1". F.-w. greyish, more or less tinged with ochreous with four blackish dots along the fold" ("Manual," Vol. II., p. 440).

VARIATION—The type is as pointed out above, more or less suffused with ochreous, others are entirely grey, and many are destitute of the black streaks and spots mentioned above; the number of these latter varies much in different specimens.

TIME OF APPEARANCE—This species is double-brooded, although in the "Manual" only July is given, which is also the only date in

Merrin's "Lepidopterist's Calendar." The first brood occurs in June, from about the 6th to the 20th is the average time, although the date varies in different seasons. The second brood feeds up very rapidly, and generally appears about August 2nd, lasting till late in the month. This year (1889) it was well out in the Isle of Wight on July 25th; and Mr. Robson wrote me that it was out some days before this in the neighbourhood of Hartlepool. In 1888, on the other hand, the season was so late that it did not apparently occur till about the 16th of August, a remarkably late date. Mr. Atmore records August 6th for 1884 ("Entomologist," Vol. XVIII., p. 172); and Mr. Walker "end of July, in 1878" ("Entomologist's Monthly Magazine," Vol. IX., p. 163).

LARVA—The larva is green in colour, much sprinkled with white dots, and like those of many of its congeners, exhibits considerable variation, being sometimes tinted with rose colour, deepening in some specimens to brownish. It has short bristles, which are chiefly confined to the head and anal segments. It feeds on sea-lavender (*Statice limonium*), in May and July. The larva of this species was first described by Mr. Moncreaff, in the "Entomologist," Vol. V., pp. 321 and 322. He writes:—"I have often carefully watched the female, but have never been able to detect her in the act of depositing eggs, so that when or how this is done I cannot say. Last autumn, I detected small green larvæ feeding on the leaves of the *limonium*, which I thought must belong to the above species, but they were so unlike any other lepidopterous larvæ that I am acquainted with, that I determined to let them alone until the spring, when they would be larger. On the first of May last I walked to their head-quarters, and after a careful search, succeeded in turning out about two dozen larvæ. They were at rest upon the food-plant, but fell off on the slightest disturbance, and so much resembled the *limonium* in colour, that it was only by searching for the plants, which showed signs of being eaten, I was able to find them. The larva, when full fed, is about 8" long; the head very small, and when the creature is at rest or disturbed it is drawn under the second segment, which is provided with two horn-like projections, and covers the head like a cowl. The third segment is the largest, and from this the body tapers gradually to the anal extremity; the last segment but one being provided with a horn as in *Sphingidæ*. Colour of the head brownish-green, six small black spots (ocelli) on each cheek, head sparingly covered with pale obtuse setæ, tips of the horns pink; the body bright green, shagreened with light and dark spots; anal segment green, with a ray of six long bristles,

which point backwards. When about to change to a pupa the larva crawls to the top of the leaf, and spins across it numerous silken threads, to which it attaches itself by the anal claspers; and in this position remains about two days. The colour gradually becomes brown, and the skin assumes a shrivelled appearance before entering into the pupal stage."

PUPA—The pupa is of the same ground colour as the larva (green), sprinkled with white spots, with rosy and purple tinted varieties. It suspends itself among its food-plant by its anal segment. With regard to the pupa, Mr. Moncreaff writes:—"The final change to a pupa is gone through very suddenly; a few minutes suffice to throw off the old skin, which remains in a little heap on the leaf, and the pupa then hangs freely suspended by the anal segments (or hooks?). It is very attenuated, and the points of the legs and wing-cases are free from the body" ("Entomologist," Vol. V., p. 322.)

Figures of the different stages of this species are given in the February number of the "Entomologist," Vol. XVI.

HABITAT—The species appears to occur on the banks of almost all tidal rivers, wherever the ground is at all marshy, and the *Statice limonium* grows. I have rarely found a patch of *Statice* in such places without finding *bennetii*. It occurs along the banks of the Thames and Medway, and all the small tidal rivers around the Isle of Wight; Mr. Atmore records it from a Norfolk locality ("Entomologist," Vol. XVIII., p. 172); and Mr. Robson informs me that it occurs near Hartlepool, so that it must have a fairly extensive range in Britain. Regarding the habitat of this species, Mr. H. Moncreaff (Portsmouth) writes ("Entomologist," Vol. V., p. 321):—"In June and July *Agdistis bennetii* is very plentiful round our island, flying over the *Statice limonium*, which grows abundantly in our salt marshes." It is almost useless searching for the imago during the day, as it is next to impossible to dislodge them from the herbage where they rest. On the other hand, at dusk, they appear simultaneously, numbers coming up from the herbage, and taking short flights from flower to flower. This continues till after dark, after which it is very slow work searching for them, as they stand resting on the grass culms, flowers, or reeds in the vicinity, with their wings rolled up as if to occupy the least possible space. In the "Entomologist," Vol. XVI., p. 28, however, we read:—"Mr. Carrington, who is familiar with the habits of *A. bennetii*, in a state of nature, informs me that the perfect insects may be disturbed from among the food-plants on the salt-marshes near the estuaries of our rivers, throughout the day, especially during fine calm

afternoons, but the time of flight is shortly after dusk until midnight." The following may be taken as a sample of an evening's work with this species. On the evening of July 29 (1889), Mr. A. J. Hodges and myself were on a piece of ground on the banks of the Yar, in the Isle of Wight, overgrown with *Statice limonium*. Patiently waiting from about 7 p.m., not a moth would make its appearance, until suddenly, at 7.45, a number of moths were simultaneously detected fluttering up the stems, and in a few minutes they were in large numbers. For about half-an-hour they were very active, but as the darkness increased, the species became more and more difficult to find, and, although long after dark, odd specimens could be taken with a light by searching, the method of capture is too slow to be profitable.

Any account of this species would be incomplete without mentioning the difficulty of setting it. It is a work of art, and the man who can successfully manipulate *bennetii* can set anything. When killed, the moths, by means of a wedge-shaped fold in the upper and under wings, roll both into a compact kind of double tube, which resists the efforts of the manipulator to unroll it, but I found that pressure with a bristle or pointed piece of paper, applied judiciously at the extreme base of the anterior wings, would cause them to unroll, and they could then be set readily. The legs, too, from their excessive length are a great trouble, and not a large proportion come off the setting-boards with well-set wings and six perfect legs.

Cnæmidophorus, Wallengren.

This genus is exceedingly rare in the Palæarctic area; Dr. Staudinger gives only two species in his "Catalogue," and I believe the genus is altogether unknown in America. In Britain we have one of the two Palæarctic species, viz., *rhododactylus*, which has a wide European range.

This genus is thus characterised by Wallengren:—"Antennæ of both sexes with very short cilia. Forehead without any tuft, only a few slightly prominent hairs between the antennæ. Palpi not longer than the head, the intermediate joint thickened with down, the last joint short and pointed. Legs short, all the tibiæ thickened towards the apex by a tuft of scales; the posterior tibiæ thickened in the middle. First pair of spines in the posterior tibiæ slender and very unequal, second pair nearly equal. Anterior wings not divided to a third part of their length, the segments broad, the posterior segment almost hatchet-shaped, the posterior angle of both segments well marked.

The divisions of the inferior wings wide, the third segment with the anal angle distinct. The anterior wings flat, covering the inferior, the inner margin not toothed" (Dr. Jordan, "Entomologist's Monthly Magazine," Vol. VI., 120.) To this Dr. Jordan adds: "That this insect is rightly separated from the genus *Platyptilus* of Zeller there can be no doubt; the difference in the palpi would be sufficient for this."

C. rhododactylus.—This species was placed in the genus *Pterophorus* by Fabricius, but removed into a separate genus by Wallengren.

SYNONYMY—*Rhododactylus*, Fab. Ent. Sys. III. p. 347, 7; Vill., Car. L. Ent., IV., 547; Hüb. 8; Treit. IX., 2. 228; Haw. 478; Dup. XI., 313, 4; Stephs. Ill., IV., 375, Pl. 41, 3; Wood, 1645; Zell. Isis (1841) 772, Lin. Ent. Zeit., VI., 326; Tgstr. Bidrag, 154; H.-S., V., p. 366; Frey 401,

IMAGO—Fabricius' original description of this species ("Entomologia Systematica," &c., Vol. III., p. 347, No. 7) is as follows:—"Alis fissis flavescentibus: strigis albis, anticis bifidis, posticis trifidis." "Alæ anticæ flavæ basi obscuriores strigis duabus albis, anteriore obliqua usque ad strigam posteriorem fissæ. Posticæ trifidæ lobis duobus anterioribus flavescentibus, tertio albo macula magna ante apicem ferruginea. Corpus ferrugineum thoracis lateribus flavescentibus." The fore-wings are divided into two lobes, the apex is pointed, and the ground colour rich ochreous brown much scattered with white scales along the costa, which develop into a large whitish blotch in the centre of the costal area; a slender white fascia, parallel to the hind-margin, extends from the costa to inner margin, the inner margin whitish and connected by some whitish scales (in some specimens) to the pale costal blotch; fringes, outer part whitish, inner dark. Hind-wings divided into three plumules; shiny ochreous brown; the third plumule white along its inner edge; fringes brown with white tips to the plumules. Head and thorax the colour of the fore-wings, abdomen the same colour, but with whitish scales. Stainton's diagnosis of the species is:—"10"-11". F.-w. dark ochreous, brownish in the middle, with a slender yellowish-white fascia before the fissure; third feather of h.-w. white at the base, the tip brown" ("Manual," Vol. II., p. 440.

LARVA—The larva varies in colour from almost pure yellow to pure green, with a purplish dorsal stripe which varies somewhat in width; the sub-dorsal and spiracular lines indistinct, pale yellowish; the spiracles themselves brownish; the skin roughened and covered with short hairs. I cannot do better than refer to the much fuller

description of the larva which is given by Mr. G. T. Porritt, in the "Entomologist's Monthly Magazine," Vol. XII., pp. 88, 89. Another description is given by Mr. South, in the "Entomologist," Vol. XVIII, p. 276. The larva feeds on the rose-buds or leaf-buds of one of the wood species of *Rosa*, and either fastens a leaf by the side of the flower-bud, or joins the leaves forming the leaf-bud together, and in this retreat feeds either on the unexpanded flower-bud or the young leaves forming the leaf-bud. The larva can be found from the middle of May to the middle of July, but is exceedingly local. In the "Entomologist," Vol. VIII., pp. 183 and 184, Mr. Porritt writes:—"On the 26th of May last, the Rev. T. D. Daltry, of Madeley, and myself, took the larvæ of *Pterophorus rhododactylus* very freely in a wood in North Kent. Mr. Daltry soon detected it feeding just beneath the leaf overlapping the rose-bud, and eating into the bud from the side. Almost as many, too, were found in a similar position at the ends of the young rose-shoots."

PUPA—The pupæ, like the larvæ, vary in ground colour, being greenish or yellowish, generally with a purplish dorsal line, which sometimes suffuses the whole of the pupa except the swollen wing-cases which are always pale; clothed with hairs as in the larva. Mr. Porritt's description of the pupa ("Entomologist's Monthly Magazine," Vol. XII., p. 89) is:—"The pupa is about three-eighths to half-an-inch in length; pale green; the wing-cases whitish; the eye, antennæ, and leg-cases, also the edging of the wing-cases smoky-black." The pupa should be looked for in July, and is found attached by the anal segment to the food-plant, in close proximity to where it has fed, either on the peduncle, leaf-bud, or leaf-stalk. Mr. Porritt found them "in the middle of July, from which they emerged in a few days" ("Entomologist's Monthly Magazine," Vol. XII., p. 89).

Figures of all the different stages of this species are given with the November number of the "Entomologist," for 1885.

TIME OF APPEARANCE, &c.—The larva occurs from May to July, changing into a pupa, as a rule, in the latter month, emerging throughout July and the early part of August. This species used to be abundant in North Kent, in Chattenden Woods, and I frequently (1873-5) captured it flying around my lamp when working for other species. Mr. Porritt found it fairly common there in 1875, *vide* "Entomologist's Monthly Magazine," Vol. XII., p. 88, and he also records it in the same journal, Vol. XI., p. 69. Mr. Stainton, in the "Manual," mentions as localities "Kingsbury and Lewisham." Mr. South, in the "Entomologist," Vol. XI., p. 253, records:—"I have found the larvæ of this

species in flowers of dog-rose, on several hedges in the neighbourhood ; one especially good locality is the lane at the back of Bun's farm. I have also found it in the same locality, in gardens, on moss roses. This same locality is referred to by Mr. South ("Entomologist." XVIII., p. 97), who had not then met with the species there since 1878, but in Vol. XVIII., p. 277, Mr. South records the capture of five larvæ in one of its old localities.

This species is, at present, therefore, one of our rarest species, and that its decadence has been caused directly by the rapacity of collectors in the North Kent locality, is certain. I was once informed, on good authority, that one of our collectors, had spent two days cutting off all the rose-buds he could find in the locality, and taking them home in sacks. When one considers the infinitely small proportion of imagines one breeds from this method of collecting, and the damage which can be done to a species whose life-history in all its stages, is so well known, one wonders at the ignorance of the collectors, and ceases to wonder how or why the species has been exterminated. As far back as 1875, Mr Tugwell drew attention to the way in which the species was being overworked. He writes :—"The beautiful *P. rhododactylus* was difficult to get in any number ; so many larvæ have been collected that the species is, and probably will be, year by year, a more scarce insect. It is well to know the life-history of all species. but at times it may not be an unmixed good, as it entails in many instances, an almost entire destruction of a species, by too closely working in it its larval state" ("Entomologist," Vol. VIII., p. 293.)

Dr. Staudinger gives as localities, Central and Southern Europe, Finland, Livonia, and Armenia, so that it has an extensive Continental range.

(To be continued.)

Some further remarks on *D. Galii*.

By W. E. SHARP.

I need hardly, I think, apologize to the readers of the *Young Naturalist* for reverting once more to the case of this mysterious insect, as the subject has proved its general interest by the discussion it has evoked. The occasion, however, of these remarks is more especially the paper of Mr. Tugwell, in the July number of this magazine. Now, if I understand Mr. Tugwell aright, his theory is somewhat as follows :—That while many species of our lepidoptera, among which I understand him to place *C. Edusa*, although extremely erratic in

their appearance, are truly indigenous, yet there are certain others, including among them *D. galii*, which, although they may breed here occasionally, are not truly indigenous, and would in fact become entirely extinct in a few years, unless recruited by wind-blown immigration from the continent.

Mr. Tugwell says that he most fully agreed with most of my former paper, but as that paper was an attempt to entirely controvert such a theory with respect to the species on which the discussion turns, I can hardly understand in what sense he does so. I trust, therefore, that Mr. Tugwell will forgive me for pointing out wherein I consider his theory to be wanting. I cannot help thinking that it explains a part only of the case, instead of all the facts. If the sole known localities for *D. galii* were the littorals of Essex and Kent his case would have been a good one, but the crux of the whole question lies not there but in the north, on the Cheshire coast, and the Scotch and Irish shores.

Mr. Tugwell contends that far more larvæ were taken last autumn in the south, than on the Cheshire sandhills. I am not concerned to dispute that, although had the fact any bearing on the question I should like to be informed, as material factors in the calculation, both the comparative areas of growth of the necessary *Galium*, and also the number as well as the capability of the searchers in the two districts. Possibly, for example, were Mr. Tugwell and myself to set out for the same sandhills, his superior perseverance and sagacity might reward him with dozens of larvæ where I should return with a hardly got ten. But, I cannot see how a comparison of captures can affect the question; it is generally allowed that both imagines and larvæ occurred everywhere where we had any reason to expect them, in much larger numbers last year than for many previous seasons.

Now, if Mr. Tugwell believes that this abundance can only be accounted for in the case of the south coasts by a foreign immigration, is he prepared to contend that similar phenomena in the north-west, in Ireland, and in Scotland, must necessarily be the result of the same cause: if so, is he also prepared to face the difficulties which the theory entails, and which I have briefly indicated in my former paper. But if not, if he agrees with me that natural local causes and these alone must be held sufficient, why deny to Kent what he allows to Cheshire.

Mr. Tugwell has, however, introduced evidence which he thinks supports his immigration theory, and this, to some extent, it undoubtedly does. I allude to the comparative size of the imagines, but I do not think in the first place, that his premises are sufficiently complete

to dogmatize upon, and secondly that if they were, they would not have that importance which he attaches to them. As I understand him he reasons thus :—

1. Continental naturally-bred specimens average nearly half-an-inch more in wing expanse than English specimens bred in captivity do.

2. English caught imagines approach much more nearly to the Continental type than to their own, presumably degenerate offspring, therefore (1) the caught imagines must be of Continental birth ; and (2) the effect of English food and climate is degeneration.

Now leaving out of account the question of the effect of artificial nurture and forcing, it strikes me that we have not nearly enough caught British imagines to found any safe conclusions upon. Can fifty guaranteed British (1888) caught imagines be produced for measurement, and are we safe to draw any general conclusions from so small a number.

But if it could be indeed established that the descendents of the insects of 1888 averaged in wing expanse considerably less than their parents, might we not explain the fact in another way than by attributing it to a difference of stock or of climate. A difference of season might have some effect. The summer of 1888 was admittedly one of maximum emergences, that is to say the occult influences, whatever they may have been of 1887 were greatly in favour of healthy larval life. Surely the same influences which led to a great number of survivals, would lead also to the greatest well-being, the utmost vigour, among those survivals, and, consequently, we might expect the emergences from such larvæ to exhibit in the imago form the characteristics of their larval life.

Again, we believe the next season to have been one of waning power and vigour. No doubt, and this is a point that must not be lost sight of, the *actual number* of larvæ at large during the autumn of 1888 was infinitely greater than during the autumn of 1887, but we fully believe that the proportion of oval, larval, and pupal *survivals* to have been less ; in short, adverse influences were at work ; the species having reached its maximum was, and is now, on the wane towards its minimum, and consequently we might expect this decreasing healthiness and vigour to be apparent in individuals no less than in the race as a whole. This, however, is merely a suggestion, and may be quite worthless, for as I said before, I do not consider the decrease in size of the bred specimens so fully proven as to force one to the conviction that the larger parents must have been of foreign origin.

To the other species mentioned by Mr. Tugwell I will not refer at length.

A. plexippus has, so far as I am aware, never been taken except near the southern coasts, and therefore, in accounting for the occurrence of that and similarly limited species, the acceptance of the blown-over theory meets with no insuperable difficulty.

The case of *C. edusa* and *V. antiopa* is different, for they, where they do occur, occur sporadically and not locally like *Galii*, but when we have settled the truth about that interesting hawk moth, we shall be perhaps better able to attack the difficulties presented by those and other day-flying lepidoptera.

Ledsham, Chester.

The Ragweed (*Senecio Jacobæa*).

By J. P. SOUTTER.

"The haunt o' Spring's the primrose brae,
The Simmer joys the flocks to follow;
How cheery through her shortening day,
Is Autumn in her weeds o' yellow."

To the eye of the botanist or artist, there is perhaps no period of the year when the neglected pastures of Britain present such a picturesque blaze of colour, and so attractive an appearance, as in a bright sunny August or September day, when the brilliant sunshine lights up the vivid golden glory of the ragweed. When the cattle stroll amongst its pliant stems, and the bees with an infinite variety of insect life, hum and hover over its corymbs of honey-scented blossoms. But gay and gorgeous as the scene may be to the casual observer, it is anything but a pleasing sight to the thrifty farmer who sees his soil exhausted by this weed, which strikes its roots deep and wide, and produces no adequate return, for it is rejected by all domesticated animals, even the omnivorous donkey and goat passing it by in disdain. It is almost ubiquitous, sharing the dubious honour with the daisy and dandelion, and being equally well-known, scarcely requires any description. It is also a most determined colonist, and having once obtained a footing in the farmer's fields, it is with the utmost difficulty extirpated. Its dissemination is greatly aided by the peculiar fruit, which like most of the *compositæ*, is furnished with a remarkable parachute-like arrangement of hair called a "pappus," typically illustrated by the "thistle-down," which, buoyed by the wind, transports the seeds to great distances. Slovenly farmers sometimes delay cutting

down the ragweed in their pastures till it is in flower, when, of course, the fruits ripen from the stored up juices contained in the now prostrate plant, and the seeds are dispersed nearly as freely as if the plant had been allowed to grow on unchecked. And as it is a perennial—sending up fresh stems from the same root every year—it is doubly difficult to eradicate. When growing freely on a bare pasture, so as to be unhampered by the surrounding herbage, the root leaves of ragweed are simply charming. They often attain a large size, frequently forming a clustering rosette a foot or more in diameter. The individual leaves are most beautifully incised, waved, curled, crimped, and puckered up, rivalling the typical *acanthus* leaf, or the more homely parsley, in artistic beauty of form. They are seen to best advantage in spring, for when the stems are developed in summer, the radical leaves wither and die off. The stems themselves are very tough, rigid, yet pliant and elastic, almost woody at the base, persisting through the winter till beaten down by heavy snows. They average three feet in height, perfectly simple and erect, clothed with leaves, and branching at the top into level-headed clusters of flowers. To the young botanist, these flowers are at first very puzzling. He misses the well-defined arrangement of the parts into calyx, corolla, stamens, and pistil, with which he may be familiar in the buttercup and rose. What at first sight appears as a single flower, with a tubular green calyx, each of the sepals ending in a black spear-shaped tip, and a corolla of some dozen or more yellow sepals, turns out to be an assemblage of individual flowers, each essentially perfect, and living together in a social community mutually helpful to each other. What appears a calyx is really an involucre of modified scaly leaves, performing the function of protecting the tender ovaries until they have matured the perfect seeds. What is actually the calyx is transformed into the hairs which form the “pappus,” and as it is inadequate to the duty of protecting the ovary it performs the function of flight, and carried the seed to its destination. The outer coloured florets of the ray have their corollas ligulate or strap-shaped, and by their spreading attitude make the flowerhead much more conspicuous and attractive. They have acquired this greater glory at the expense of one of their essential organs, that is they contain pistils with styles and stigmas only, being dependent for the pollen to fertilise their ovaries upon the tubular florets of the centre. These central florets, whilst yet unopened, appear like so many pinheads, by and bye they uncloset and display a hollow tube, with a slender shaft in the centre; this is a hollow column formed by the cohering anthers, which are

attached by exceedingly slender threads to the sides of the corolla tube. As the floret matures, the style forces its way upwards through the staminal cylinder, pushing the orange yellow pollen dust before it; as soon as it emerges from the encircling anthers it unfolds its forked style, which ultimately curls backwards, and exposes the stigmatic surfaces to be fertilised by the pollen of adjacent florets. Thus is manifested in these compound flowers the marvellous correlation of forces, the harmonious adaptation of means to an end, which pervades the minutest of nature's works. We see a wondrous community of interests by the aggregation of a number of minute flowers into one large head, which is rendered yet more conspicuous by the outer ray florets, and these, with striking self-abnegation, have developed large coloured petals at the expense of their stamens, and are, therefore, now dependent for their fertilisation upon their less showy, but yet functionally perfect tubular brethren. Again, although each little floret produces only a solitary seed, the general result is a large number on one head, just as a single flower of a pea or a poppy produces a great number of seeds. The careful student will soon find numerous instances of equally fascinating socialism or communism in plants.

The natural order *Compositæ* is the largest in the vegetable kingdom, its chief characteristic being the aggregation of its individually small florets into little colonies or flower-heads. Many of our best known florist's flowers belong to this order, such as Dahlias, Asters, Marigolds, Chrysanthemums, &c. *Senecio* is one of the largest genera, including some 500 species, of which about ten are indigenous and several more naturalised in Britain. After the ragwort, the most generally distributed and best known is the "groundsel" *S. vulgaris*, a most inveterate weed of gardens, rivalling the chickweed in its obnoxiousness to the gardener, and even excelling it in its persistence of blooming. There is not a month in the year but what in neglected gardens and waste places its inconspicuous yellow flowers, and silvery white pappus of the mature fruit may be observed. As the school-boy's rhyme says :—

"Through storm and wind,
Sunshine and shower;
Still will you find
Groundsel in flower."

Its flowers are remarkable for the total absence of the ligulate ray florets, being all tubular, although a variety has been met with in which a ray has become developed. It bears a rural repute as an

emollient poultice, for swellings, wounds, and ulcers, thus redeeming the whole tribe from the charge of utter worthlessness. The most closely allied species to our *Jacobæa* is *S. aquaticus*, which bears a striking family likeness, but the flower-heads are rather larger, the ray florets being longer and broader, forming a continuous rim instead of standing out star-fashion as in the ragweed. The root-leaves are generally entire and the stem-leaves much less divided than in *Jacobæa*. It grows in damp places by ditches and river-banks and is widely distributed. A much more local species is *Erucaefolius*, which is easily distinguished by the hoary hairiness which clothes every part of the plant. In Scotland, it is only found in the south, and in England is local, seeming to prefer a limestone soil.

The ragweed seems more noticed by the entomologist than the poet. The heavy odour of its blossoms attracts an infinite variety of insect life, making it a happy hunting-ground for the "fly-catcher." But there is an utter lack of sentiment associated with its prosaic career. It is not mentioned in the language of flowers, and I have not been able to find it even alluded to by any of the poets. However, the following lines may held to fairly express the general estimate of its character :—

"Thou pleasest no man's taste, none gather thee
For sweetness, colour, fragrance, or fair form ;
Thou gracest no maid's bosom, may'st not come
'Mong gaudier mates within palatial halls."

Still it forces itself upon the notice of the agriculturist, and has acquired quite a variety of names, some of them not very complimentary. Its most general name of "ragweed" or "ragwort" is commonly held as applying to its ragged leaves, but it is said to have a much more ancient derivation, in allusion to certain reputed aphrodisiac virtues associated with it along with several others of the rayed composite flowers. In various localities it is known as "seggrum," "seggerwort," "staverwort," and "staggerwort. And this, not from any virtue as a cure for the disease of "staggers," but because of its repute as a vulnerary and styptic in certain operations performed on horses and cattle. In Durham, I have heard it called "haygreen," or possibly "ayegreen," perhaps from the vivid green of the root-leaves. In Scotland, it is generally known as "tansy," possibly from a similarity of general form and odour, which is believed to aid in warding off infectious diseases and insect plagues. The true "tansy" *Tanacetum vulgare* is very rare in the north. Another Scottish name is "stinking willie," from its heavy rather unpleasant odour when bruised.

A most expressive title is "sit-sicar," from the difficulty of putting it up by the roots, or otherwise eradicating it.

In Gaelic and Irish, it has a name signifying "the yellow plant that overcomes," or "the yellow-stalked plant." In Welsh, it is known as "the hare's plant" and "the serpent's weed." Amongst Celtic races it seems to be associated with the fairies. In Ireland, it is known as "fairies horses," because the good little people were believed to ride on the stems of ragweed, just as the witches were supposed to bestride a broomstick, or a thorn branch on their aerial excursions. The botanic name *Senecio* from the Latin *Senex* an old man, is an allusion to the silvery hairs of the pappus, like the hoary head of an aged patriarch. The specific name *Jacobæa* is the Latin *Jacobus*=James, hence it is St. James' wort, but why the good saint should have such a worthless plant associated with his name baffles my comprehension, except that it comes into flower about the day (July 25th) consecrated to the memory of that Apostle and Martyr.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

September 4th, 1889.—Capt. H. J. ELWES, F.L.S., Vice-President, in the chair.

Prof. C. H. Fernald, of Amherst, Mass, U.S.A., and Mr. C. J. Fryer, of Emscote Road, Warwick, were elected Fellows; and Prof. C. V. Riley, of Washington, U.S.A., and Dr. A. S. Packard, of Providence, Rhode Island, U.S.A., were admitted into the Society.

Mr. George T. Baker exhibited two remarkably dark specimens of *Acronycta ligustri* taken near Llangollen.

Mr. P. B. Mason exhibited and remarked on a collection of Lepidoptera which he had recently made in Iceland. The following species, amongst others, were represented, viz.:—*Crymodes exulis*, *Triphæna pronuba*, *Noctua conflua*, *Plusia gamma*, *Larentia cæsiata*, *Melanippe sociata*, *Coremia munitata*, *Phyeis fusca*, and *Crambus pascuellus*.

The Rev. Dr. Walker also exhibited a number of Lepidoptera, Diptera, and Hymenoptera, recently collected by himself in Iceland. The collection included the following, viz.:—*Crymodes exulis*, *Noctua conflua*, *Larentia cæsiata*, *Coremia munitata*, *Culex pipiens*, *Scatophaga stercoraria*, *Calliphora erythrocephala*, *Helophilus grænlantica*, *Bombus terrestris*, &c.

Mr. W. White exhibited, on behalf of Mr. G. C. Griffiths, a specimen of *Nephronia hippia*, Fab., var. *gæa*, Feld., which he believed to be hermaphrodite. He also exhibited, for comparison, a female of the same species. A discussion on hermaphroditism ensued, in which Mr. Distant, Capt. Elwes, Mr. M'Lachlan, and Mr. Baker, took part.

Dr. Sharp exhibited specimens of *Cychramus luteus*, and *fungicola*, auct., and stated that they are the sexes of one species, *C. luteus* being the male, *C. fungicola* the female. In working through the Central American *Cychramini*, he had found that in some genera the males differed greatly from the females in size and sculpture; but this was not a constant character, for in some species, while certain males scarcely differed from the females in these respects, others were so different that they would scarcely be recognised as belonging to the same species.

Mr. Edward A. Butler exhibited specimens of *Platymetopius nudatus*, Deg., from Ewhurst, Surrey. He remarked that the species was recorded as having been once previously taken near Plymouth by the late Mr. John Scott.

Mr. G. T. Baker read a paper entitled, "On the distribution of the Charlonia group of the genus *Anthocharis*." Mr. Baker stated that the species, six in number, of this small division of the genus *Anthocharis* formed a very natural and closely allied group, presenting many points of interest both in their relationship to each other and in their geographical distribution, which extended from the Canaries on the west to the valley of the Indus on the east. The author's theories as to the causes of the present distribution of the group, which were based on geological data, were discussed by Capt. Elwes, Mr. M'Lachlan, Mr. Distant, and Mr. Stainton.

The Chairman read a paper entitled "On the genus *Argynnis*," which gave rise to a discussion in which Mr. Distant, Mr. Jenner Weir, and Prof. Riley took part.—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

August 15th, 1889.—Mr. HUCKETT, Vice-President, in the chair. Mr. J. A. Clark read a paper on "The Life-History of *Phorodesma smaragdaria*," fully describing the habits of the larva, manner of pupation, and peculiarities of the imago. In illustration of the paper, he exhibited sections of the food-plant, showing the larvæ of all sizes, cocoons showing enclosed pupæ, and a fine series of the perfect insect. Mr. Milton exhibited a specimen of *Tabanus autumnalis*, bred; also *Hadena atripticis*. Mr. Manley, series of *Liparis monacha* bred from ova and a beautiful pink variety of *Cosmia trapezina*. Mr. Heasler exhibited Coleoptera from Abney Park.

September 5th, 1889.—The Vice-President in the chair. Mr. Cripps exhibited Coleoptera from Plymouth and the New Forest, including three specimens of *Cassida murræa*. Mr. Boden, *Eros minutus*, from Croyden. Mr. Heasler, a box of aquatic Coleoptera. Mr. J. A. Clark, *Carabus catenulatus* and *Geotrupes sylvatica*, from Brockenhurst. Mr. Lewcock, a series of beetles presented to him by Mr. Champion, including *Harpalus cupreus*, *Aphodius villosus*, *A. zenkeri*, *Sitones cambricus*, *Cathormiocerus socius*, &c. Mr. Clark also exhibited Diptera, and contributed remarks on *Tabinus bovinus* and other species of the same genus. Mr. P. W. Jarvis, Diptera from Cromer and Hackney Marshes. Mr. Cripps, a fine specimen of *Sirex gigas*. In Lepidoptera, Mr. Boden showed an interesting series of *P. phleas*, one specimen having its hind-wings devoid of the red and blue markings; the same exhibitor also had a var. of *Arctia mendica* with confluent black spots, and a series of *X. cerago*.

Mr. Manley, *P. agestis*, *alexis*, and *corydon*, from Riddesdown. Mr. Bellamy, a var. of *Angularia*, *H. popularis*, *cespitis*, and *C. elingvaria*. Mr. Sampson, a fine series of *H. semele*. Mr. Battley, a peculiar var. of *A. caja*, and a few specimens of Diptera. Mr. Lusby, two pupæ of *L. quercus*, which pupated in August, also *adonis*, *cerago*, and *graminis*. Mr. Hockett remarked on the pupation of *B. quercus* and *callunæ*, the latter being in pupa during the winter, and the former in summer. Mr. Clark presented on behalf of Mrs. Eedle four cases of life-histories of Lepidoptera, being the last work of her late husband. Mr. Jarvis read a paper on British Diptera, describing their life-history, generic distinctions, &c. A discussion ensued, in which Messrs. Hockett, Lewcock, and Pearson took part; and a vote thanks was accorded to Mr. Jarvis for his entertaining paper.—G. A. LEWCOCK and E. HANES, Joint Hon. Secs.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

August 22nd, 1889.—J. T. CARRINGTON, Esq., F.L.S., Vice-President, in the chair. Mr. Wellman exhibited a number of *Abraxas grossulariata*, showing considerable variation, and *Scoparia angustea*, from Folkestone. Mr. Skinner, a bleached example of *Epinephle janira*, taken at Box Hill. Mr. Carrington on behalf of Mr. Lewcock, some 300 specimens of Coleoptera taken during the season, being some of the larger aquatic species, a few *Donaciæ*, *Malacoderma*, *Heteromera*, &c., mainly from Chattenden, Epping, Woking, and Farnham. A discussion took place on the late nidification of birds, Messrs. Rice, Carrington, Tugwell, and Turner taking part. Especial reference was made to the Yellow Hammer (*Emberiza citrinella*), the Bunting (*E. miliaria*), and the Redpole (*Linota linaria*).

September 8th, 1889.—T. R. BILLUPS, Esq., F.E.S., President, in the chair. Mr. Jenner Weir exhibited desquamated upper wings of the male of *Argynnis paphia*, in order to show that the apparent thickening of the median nervules and sub-median nervure, in that sex of the species, was due to the dense covering of broad scales, bent over and concealing some very narrow clavate, black scales or androcomia; these appeared to be of a different substance to the ordinary scales of the wings, so that when, by the Waterhouse process, he had denuded the wings of the ordinary scales, the androcomia remained intact, and were removed by the use of the camels' hair brush, considerable friction being necessary. Mr. Weir remarked that he had been induced to bring this matter before the Society because he found that some British Entomologists appeared to think, that, in the restricted genus *Argynnis*, there was a real dilatation of some of the median nervules, and occasionally of the sub-median nervure, but a reference to Mr. Scudder's work on the "Butterflies of the Eastern United States and Canada," and to the "Exotische Schmetterlinge von Dr. Staudinger and Dr. Schatz" would show that neither the American or German entomologists named had fallen into such an error. Mr. Weir also exhibited some specimens of *Vanessa urticæ*, bred from larvæ, taken at Lewes, these, although bred from one locality showed great variation in the amount of yellow on the fore-wings, in one instance that colour formed almost a band across the wings, and in one of the specimens the costa was unusually dark and the red of the lower wings very

much reduced in extent. Mr. Wellman, *Bryophila glandifera*, *polycommata*, and dark forms of *Gnophos obscurata*, from Folkestone. Mr. Croker, *G. obscurata*, from the New Forest, and a variety of *Tæniocampa gothica*, closely approaching *gothacina*, taken at West Wickham. Mr. Fenn mentioned that he had taken a similar variety at Lewisham. Mr. Auld, a long series of *Cidaria russata*, bred from a female captured in the New Forest. Mr. Turner, a pink variety of *H. sordidata* also dark forms of *Boarmia rhomboidaria* from Ashdown Forest and specimens of *C. rotundaria*. A discussion ensued as to whether this was a distinct species or only a variety of *C. pusaria*.—H. W. BARKER, Hon. Secretary.

Notes and Observations.

C. EDUSA NEAR LIVERPOOL.—On September 1st, at Hale, near Liverpool, a male example of this uncommon species suddenly came upon us, from the vicinity of a clover field, close by the lighthouse and flew briskly in the direction of the river where we unfortunately lost sight of it.—JOSEPH COLLINS, Warrington.

DEILEPHILA GALII AT WALLASEY.—I went on the sandhills yesterday and soon discovered some frass. It is by finding this first we trace the Sphinx when the larva is not exposed to the sun. Follow the frass as it grows larger and when it ceases scratch about the sand and tumble it out. Mrs. G. took one yesterday on the first patch of *Galium* she came to, but they are rare this season compared to last.—C. S. GREGSON, Liverpool.

SCARCITY OF LEPIDOPTERA.—I spent two days in a locality where I expected to meet with *L. corydon* freely, and where it occurs in abundance as a rule, but owing to the boisterous bad weather I could only take about a dozen. The second brood of *Adonis* has so far as I can hear been very scarce. It has indeed been a very bad year for collecting. I have made nineteen special trips, and of these I can truly say thirteen were utter failures.—H. J. TURNER, 13, Drakefield Road, Hatcham, S.E.

POLIA NEGROCINCTA, D. CÆSIA, &c.—I collected some fine full-fed larvæ of *Polia Negrocincta*, in June, at the Isle of Man, from which I have bred a grand series, with a few *Epunda Nigra*, amongst them I also took *Dianthæa Cæsia* on the wing in the Island; but I am sorry to say not in very fine condition. I also bred a fine *Colquhounana* but I lost most of my larvæ as they made their escape. I found this season, for the first time, larvæ of *Penziana*, although I only bred one moth I shall hope to breed it another season.—H. MURRAY, Lowbank Villas, Carnforth, September 14th, 1889.

VARIETIES OF *ARCTIA MENDICA*.—Mr. Porritt has favoured me with a sight of the proof of a plate of the wonderful varieties of this species he has reared during the past two years, from ova obtained from truly wild females taken in the neighbourhood of Huddersfield, and which have already been alluded to in the reports of the Entomological Society of London. The 1888 specimens figured consist of six females and two males. The males are blacker than any I have met with, and have a peculiar reddish tinge. The spots are very distinct and large, with a tendency to run into streaks and rays. The females are much more spotted with black, and are tinged with cream colour along the costa and at the base of the wings. The markings on one of them are much like extreme forms of *Lubricepeda* (not var. *Zatima*). But those of the present year diverge from the typical form much more than the 1888 specimens. In a general way the spots on the wings of *Mendica* are both few in number and very inconspicuous. In some of these extraordinary varieties, the spots are both numerous and very large. In others they run into streaks and blotches, one having a long black streak extending along the inner margin, from the anal angle to the base. The most extreme specimen has the ground nearly all suffused with black scales. Four of the eight 1889 females figured have the row of spots across the wing, in the style of *Lubricepeda* as named above. Another peculiarity in these is that the hind-wings have a row of spots round the hind margin. In that mentioned above as having a streak along the inner margin, the hind-wing has a row of streaks or blotches rather than spots. In the hundreds of specimens of this insect I have bred or captured, I have never had but one with a distinct row of marginal spots on the hind-wing, and these are not nearly so conspicuous as upon the least marked of Mr. Porritt's varieties. In two of his specimens the hind-wings are much suffused. Mr. Porritt tells me each female deposited less than fifty eggs. There are eighteen varieties depicted in the plate, a very large proportion certainly, though he is of opinion that the normal form of the species does not occur at Huddersfield. What a singular thing it is that while the Irish specimens appear to be losing their dark scales altogether, the males being cream-coloured at most, these Huddersfield forms are tending to absolute melanism in both sexes. I fear my words will convey but a faint idea of these marvellous specimens, but I could not let the opportunity pass without trying to describe them.—J. E. ROBSON, Hartlepool.

Gossiping Notes on British Coleoptera.

By G. A. LEWCOCK.

III. HABITATS AND LOCALITIES.

At the time these papers were first suggested, it appeared to me that a compilation of this character would be very much like going over other people's ground and treading in their footsteps, but it was urged that works on Coleoptera were very expensive and often intensely scientific, and that a series of papers, which should embody the personal experience of the members of the City of London Entomological and Natural History Society, and that of their friends, together with as much other information as it was possible to collate, respecting the occurrence and capture of the various species of this order, would be acceptable not only to the members of that Society, but also to other students. It was likewise stated that "the question of localities frequently proved a source of great trouble to anyone beginning the study of lepidoptera and other orders of insects, and this arose chiefly from the fact that the literature on the subject was calculated as much to mislead as to direct the student in his researches."* Moreover, it was argued that experienced collectors, who have spent much time in diligently working up localities for their favourite genera, do not care to point out the exact place from whence they have obtained their captures: thinking, perhaps, that were they to do so, numbers would flock to their cherished locality, destroy the habitat, and thus exterminate the insects at that spot.

Mr. E. W. Janson sorrowfully relates an incident of this kind, which occurred to himself. He had written a paper for the *Annual*, entitled: "Observations on the Myrmecophilous Coleoptera," and therein given directions for the working of ants nests; he had also enumerated some 36 species found in this habitat, and half promised an essay dealing more fully with the subject in the succeeding year. His plan for obtaining beetles from the nests of *Formica rufa* was as follows:—"Having conveyed a supply of large rough stones—smooth ones will not do—or, failing these, bricks, to the wood which is to be the scene of action, and where, I presume, are found at least several colonies of the ant; place three or four of them on the hillock on its sloping sides; treat all the nest in the same manner. The nests must be visited as frequently as practicable during the greater part of the year; nearly all the beetles enumerated in the subjoined list as co-

* The quotations in this article, unless otherwise stated, are from a paper expressly written for me by Mr. H. Cripps.

habiting with this ant were found either on the under surface of the stones or beneath them. *Myrmedonia humeralis*, however, I have only once met with in a solitary individual, beneath the stones; but occasionally in some numbers under leaves and at the roots of grass in the immediate vicinity of the nest. As spring advances, and the ants betake themselves to labour at the extension of the hillock, a piece of old, rough, dry wood should be placed on the summit; this will in a few days be gradually covered by the newly-brought material, and should be occasionally withdrawn and smartly tapped over a large sheet of paper or cloth; it was thus I succeeded in taking *Dinarda Mackelii*, and, in the autumn, *Monotoma angusticollis* and *conicicollis*.

"The examinations should always be made early in the morning, before ten; in the heat of the day I never met with success. A fine morning succeeding a wet day after dry weather is peculiarly favourably, and should always be devoted to a trip to the ants' nest. In the sultry months of July and August, the ants nests should not be touched: my searches have ever been fruitless at that period of the year; the young brood of ants, upon which the welfare of the colony will next year mainly depend, is now assuming the imago state, and the old workers exhibit an irritability not observable at other times. At the end of August, or the beginning of September, the collector should resume his researches. Several of the species found in the spring re-appear in the autumn, and two—*Monotoma angusticollis* and *conicicollis*—are to be met with then only. He that would succeed in the investigation of ants nests must be prepared to fail; according to my experience, about one nest only in twenty contain beetles: during the last three years I have tried upwards of a hundred nests, which has involved the transport, in some cases for miles, of no trifling weight of stones and bricks,—for these are not to be found in woods,—but by dint of sheer perseverance I have discovered within the metropolitan district by far the greater proportion of the species known in France and Germany to frequent the nests of *Formica rufa*" (*Annual*, 1857).

So far, all went very well, but in the following year a catastrophe occurred, and he says:—"The.....essay on the laws affecting landlord ants and tenant beetles must now be deferred *sine die*,—the rush made by certain metropolitan collectors to the only localities accessible to me, and where, by scrupulously abstaining from injuring either the ants or their domicils, I had for three consecutive years tranquilly carried on my investigations,—the diligence with which they ransacked every nook and corner, and the ruthlessness with

which they grubbed up and utterly destroyed every nest, having brought my favourite pursuit to a sudden, and, I must admit, somewhat unlooked-for termination. In publishing my *Ants' Nest* paper in last year's *Annual*, I was actuated by the desire of sharing with others the pleasure and profit which I had culled in a path previously untrodden in this country, little expecting that sordid *amor habendi*, rampant and strong as I well knew it to be in the majority of collectors, would have led them to exclude me henceforth from all participation in the dainty dish which I had set before them. And what has science gained at [their] hands?.....Have they contributed one solitary fact to our store, thrown one dim ray of light on the mysterious relationship between the ant and its beetle guest? Science to these men is a mere outward garb, a sort of west-end paletot, which imparts an air of respectability to the wearers, and to their sordid selfish acts the semblance of scientific research." (*Annual*, 1858.)

Mr. Cox does not pretend to deal in a precise manner with this subject in his *Handbook*,* but rather leaves the student to his own resources; although he gives a general direction in the Introduction "respecting the time and place in which beetles should be looked for; the time is *always*, and the place is *everywhere*. In the spring a reversed umbrella or large net should be held beneath hedges or trees while they are beaten with a stick; in summer, a canvas or a strong linen net should be swept over long grass, flowers, &c.; in the autumn, fungi pulled to pieces over a sheet of brown paper, yield a good crop; while in the winter, moss, dead leaves, &c., can be shaken into a bag and the contents examined at leisure. The most productive times are the spring, early summer, and autumn; while as regards place, a clay soil is considered unfavourable, but chalk and sand are accounted very good. In sand-pits, with straight cut sides, many good species often occur; rough, undisturbed ground is always better than culti-

* Since August issue of the *Young Naturalist*, I have received some communications respecting my remarks on Mr. Cox's work; my reason for saying that it was "unrivalled" was simply this—there is no other completed British *Handbook* in existence. Canon Fowler's is certainly in progress, but not yet finished; therefore Mr. Cox's book is still "unrivalled," and as such is "pre-eminent." It may be as well here to refer to Mr. Stainton's words on the subject in 1857:—"At the present day the collectors of beetles in this country want a clever man to write them a *Manual of British Beetles*; and whether we hunt high or low amongst our *Coleopterists*, the fitting man cannot be found. Surely this state of things will not last!" It lasted until 1874. The circumstances of the case, I think, seem to warrant the expressions used.

vated, and mountains and the sea-shore are inhabited by many peculiar species. Dead animals, ants' nests, and damp layers at the bottom of haystacks, heaps of vegetable refuse, dung, the bark of trees, the sap flowing from wounded trees, and solid wood, both in and out of houses, each furnish their contingent of beetles, and during the summer, when ponds, &c., are partially dried up, the small residue of water provides a good supply for the water net. The muddy banks of ponds contain many species, and in general damp ground is better than dry."

Too much information, especially with regard to local species, is certainly detrimental, but something a little more definite than the above might be given. When Mr. Stainton compiled his excellent "Manual of British Butterflies and Moths" (which, to my idea was one of the best works of the kind ever written), he obtained records from correspondents in certain districts, summarised them, and presented a life-history of each insect in a most concise form—the time of occurrence of larva and imago, food-plant, and the locality; also signs denoting that it occurred, or at times, had been unusually common in certain districts. Now both Stephens' Manual and Curtis' work, though giving a deal of information, contain many errors; besides which, several new species have been added to the list, and others have been eliminated; whilst a reference to continental authors requires a knowledge of foreign languages, and there also we meet with many errors. One fruitful source of error is the constant repetition of the localities of early authors, "such a locality, for instance, as 'Battersea Fields,' which has so completely disappeared, that it is all but impossible to define the boundaries of the district formerly known by that name. Other localities, as 'near the mill at mouth of Wandle, Wandsworth,' or 'field by the river, near Hammersmith,' have long ago been converted into 'spoil banks' or otherwise destroyed."

Again, when looking up a species, one is often referred to "London district." This, at any rate, is a gloriously uncertain term to apply to a locality. I will exemplify this. It may sometimes happen that a coleopterist, resident in the country, is on a visit to London, possibly with the view of obtaining local species. If his ideas of the extent of the London district are similar to those of the postal authorities, or the inhabitants of London, he will be greatly deceived; but if he takes the larger view, which coleopterists generally understand this term to mean, he will find that the term "London district" includes almost all the country in the basin of the Thames, for a distance of about 25 miles round, and comprises every known geolo-

gical stratum, and consequently presents a great diversity of physical features.

With a view of obviating some of the foregoing difficulties, a plan was suggested a few years since whereby the country was divided into districts, with a river or stream for their centre, or what is termed the "catchment basin" system. At first sight this may seem to be a good and natural division, but on a closer examination, I fail to see that the student would derive much assistance from the scheme, or that it would be of advantage in investigating the fauna of any district; the tracts of country indicated being often of such vast extent (as in the case of the Thames), and in others too narrow (as in small streams), that nothing particular is pointed out, and, therefore, the divisions serve no purpose whatever. Every student of entomology and botany knows that the characteristics of a district are its most important guides to the species to be found within its borders; and if he be directed to search particular basins, without a knowledge of their fauna, he would probably commence operation at their centres, where, in most instances, the soil would be nearly always the same, viz., valley-alluvium, consequently similar insects would occur in each basin.

Districts which possess a variety of soil are of most interest to entomologists; and this variety is more likely to be found on the ridges of land which form the watersheds than in the valleys, as the underlying strata crop out as we get further away from the river. Thus, if the boundary of a district be made where the water divides, the line must be drawn through the middle of a chalky soil or of a sandy tract, and insects will then be recorded in two or three divisions instead of one: the actual locality being on the boundary of each. In the Thames valley, where the formation varies from the carboniferous to the latest alluvial deposit, the indication that an insect occurred there would be quite as definite if it were given as England. Information of this kind is therefore of no practical value to the student, and it would be better, under the circumstances, to leave him to his own resources.

The time of occurrence, if it be carefully given from actual experience, and not taken from the capture or reputed capture of an insect as recorded years ago, is often of great assistance in searching for species that are not only difficult to rear, but which also have a very limited period of existence in the perfect state.

The work of Canon Fowler (now issuing from the press), entitled "The Coleoptera of the British Islands," approaches more nearly to the wants of the student than any book yet published; it contains not

only the descriptions of new species recently added to the list, and the experience of the whole front rank of British coleopterists of the present day, but has also this further advantage, viz. that the author, by his great knowledge of languages, has been enabled to comprise all the reliable continental information respecting the life-history of many of our British species, which otherwise would not be obtained. Extensive lists of localities and habitats are given with each insect, in many instances verified by the name of the captor. Most persons will readily recognise the important notes of Mr. G. C. Champion and Mr. J. G. Walker, two of the most prominent and successful coleopterists of our time. Dr. Sharp and others also render valuable assistance. The work, when completed will form a fitting memorial of the eminent author, who for many years has assiduously laboured in collecting and digesting the materials wherewith by his perseverance and industry he has been enabled to produce so invaluable a contribution to the literature of the British coleoptera.

(To be continued.)

The Pterophorina of Britain.

By J. W. TUTT, F.E.S.

(Continued from page 203.)

Platyptilia, Hb., Zell.

The genus *Platyptilia* is a very natural one, the peculiar angulated apex of the anterior wings, and the dark blotches on the anterior wings are placed in almost precisely the same position, and are very similar in shape. Some of the species are very closely allied and difficult to distinguish except by experts. In Britain we have five species, four of which form two closely allied pairs viz.: (1) *ochrodactyla* and *bertrami*, and (2) *gonodactyla* and *zetterstedtii*, together with the *isodactylus* of Zeller. In the European area we find eleven species, some of which, however, are doubtfully distinct; in North America there are a much larger number of species. Dr. Jordan mentions 15 in the "Entomologist's Monthly Magazine," Vol. XVIII., p. 121. Only one species, *bertrami*, is common both to Europe and America. Many of the species are internal feeders, feeding in the flower-stalks and stems of various *Compositæ*, but there are exceptions to this rule—*P. cardui*, a North American species, feeding gregariously, and *P. orthocarpi*, on flowers of *Orthocarpus*, one of the *Scrophulariaceæ*. The larvæ of the two broods of our British *P. gonodactyla* offer two very divergent forms in

their method of feeding, the larvæ of the first brood being practically internal feeders, and those of the second (summer) brood, practically, external feeders.

This genus is thus characterised by Wallengren, according to Dr. Jordan, "Entomologist's Monthly Magazine," Vol. VI., p. 120:—"Antennæ of both sexes with very short cilia. Forehead adorned with a more or less elongated tuft. Palpi longer than the head, rather rounded, slightly ascending, with the last joint more or less elongated, sometimes a little drooping. Legs longer, slender, the tibiæ sometimes slightly thickened towards the apex. First pair of spines in the posterior tibiæ slightly unequal, second pair almost equal, shorter than the shortest spine of the first pair. Anterior wings not divided to the third part of their length, the segments broad, the posterior segment almost hatchet-shaped, the posterior angle of both segments well marked. The segments of the inferior wings more slender, the third division with the anal angle sufficiently marked, but nearer to the base. The anterior wings flat, covering the inferior when at rest. The veins of the anterior wings ten in number; 1st and 2nd separate, coming from the base, the 3rd from the posterior margin of the cell, the 4th and 5th from the posterior angle of the cell, all running into the posterior segment, the 6th coming out near the anterior angle of the cell, and running into the posterior angle of the anterior segment, the 7th two-branched, coming out from the anterior angle of the cell, and running into the apex of the anterior segment, the 8th and 9th coming out from the anterior side of the cell and running into the anterior margin of the wing, the 10th coming from the base and ending almost in the middle of the anterior margin. The cell well marked, with a very slender little transverse vein, almost straight, closed. Veins of the posterior wings three in number; the 1st coming from the base, two-branched running into the anterior segment, the 2nd three-branched, running into the second division, and the third simple, running into the third division. No cell."

In this genus, the first two species are so closely allied that Prof. Zeller suggested, and Lord Walsingham ("Pterophoridaæ of California," &c.) appears to have agreed with the idea that the two species really were not distinct, and Dr. Jordan, in the "Entomologist's Monthly Magazine," Vol. XVIII., p. 75, discussed the same matter at some length. Mr. South, "Entomologist," Vol. XVIII., pp. 280-282, taking up the views propounded by these authors, attempted recently to convince lepidopterists that they were one and the same species.

However, they are still considered distinct by most Continental lepidopterists, and have been differentiated by Mr. Stainton; while the late Mr. Sang, who probably knew as much of these species as any one, was convinced of their distinctness, as also is Mr. Porritt, who knows both species in a state of nature, and who has paid great attention to, and carefully reared them. The food-plants of the two species are very different, and one *ochrodactylus* (*dichrodactylus*) is popularly called in Britain the "tansy-feeder," while the other, *bertrami*, is known as the "yarrow-feeder." Again, Mr. South seems to have ignored the statements of Mr. C. G. Barrett ("Entomologist's Monthly Magazine," Vol. XVIII., p. 177) relative to the difference in the manner in which the two species feed in nature. Mr. Barrett considers that "the habits of the larvæ seem certainly to point to the distinctness of these two species." Mr. Porritt, "Entomologist's Monthly Magazine," Vol. XXIII., p. 163, writes: "Any one having experience with both species *alive*, can scarcely help noticing the differences." This was written in 1886, and, hence I assume, was meant directly to question Mr. South's conclusion of November, 1885 ("Entomologist," Vol. XVIII., pp. 279-282).

In the "Entomologist's Monthly Magazine," Vol. II., pp. 137-138, Mr. Stainton writes:—"At Frankfort, last month, I noticed in the collection of my friend, Herr Mühlig, a new plume closely allied to *ochrodactylus*, bearing the name *dichrodactylus*. The following day I visited Dr. Rössler, at Wiesbaden, and again I saw the same insect, only with him it bore the name *ochrodactylus*, and for the other species a new name was proposed of *bertrami*. Which is the veritable *ochrodactylus* will probably be a very nice question. Herrich Schäffer has no doubt figured *dichrodactylus* under that name, but the very faults which he finds with Hübner's figure would imply that Hübner had represented the other species. I am also disposed to think that the *ochrodactylus* of Zeller is also *dichrodactylus*; for the present, and to avoid confusion, it may be advisable to drop the name altogether. We have in lieu thereof the two species *dichrodactylus*, Mühlig, and *bertrami*, Rössler. Herr Mühlig has described his *dichrodactylus* in the 'Stettin Entomologische Zeitung,' for 1863, p. 113. Dr. Rössler has described his *bertrami* in the eighth volume of the 'Wiener Entomolog. Monatschrift,' p. 53." Mr. Stainton also adds: "*Dichrodactylus* has the apex of the anterior wing more proleged, more falcate than in *bertrami*, and the brown scales on the hind margin of the third feather of the posterior wings should be more distinct. The best character, however, is furnished by the hind-legs: in *bertrami* the tibiae are

slightly browned, but the tarsi are spotless whitish; in *dichrodactylus* the tibiæ are brown at the middle and apex, and there is a brown spot at the end of the first tarsal joint. These three spots have, in bred specimens, a very conspicuous appearance." Dr. Jordan, "Entomologist's Monthly Magazine," Vol. XVIII., p. 75, writes:—"As to the identity of *ochrodactylus* and *bertrami*, I confess myself quite unable to give a decided opinion, there seems to me no distinct line between the richly fawn-yellow specimens with falcate wings, and the pale straw coloured insects with the apex as square as in *gonodactylus*, the extremes of the series look most distinct, but the gradations are such as to make it very difficult to draw the boundary line." Dr. Jordan then quotes Mr. Stainton's distinctions as given above, and then goes on to say:—"Heinemann in the "Die Schmetterlinge Deutschlands, &c.," Vol. II., p. 784, draws the following distinctions: 'Very close to the former species (*ochrodactyla*), but the fore-wings less sharply pointed, all the brownish-red dusting paler, the spots before the division pale, often entirely wanting, the lines at the hind border finer; on the third feather of the hind-wing the black scales behind the middle are either less or wanting. The legs are yellowish-white, the tibiæ of the fore-legs are brown at the end, in the hind tibiæ the reddish brown colour is equally spread from the middle to the end. It is widely diffused, the larva lives in *Achillea ptarmica* and *Tanacetum vulgare*.'" Dr. Jordan then adds:—"These distinctions slight as they are, seem certainly inconstant in apparently fine examples; added to this Heinemann makes the food-plant of the larva doubtful, for he says of *ochrodactylus*, 'in the stem of *Tanacetum vulgare*,' of *bertrami*, as quoted above, he says, in *Achillea ptarmica* and *Tanacetum vulgare*.'" I have a series of bred *ochrodactyla*, which I received from the late Mr. Sang, and a long series of *bertrami* taken in many different localities, and quite agree with Dr. Jordan that the superficial differential characters are most inconstant. Dr. Jordan adds a most important note to his article on this subject, p. 76. It is as follows: "There is now before me a specimen of *bertrami*, bred by Lord Walsingham. The pupa was found on a stem of *Artemisia campestris* (there was no *Tanacetum** near), which may prove therefore, to be another food-plant. It has for *bertrami*, remarkably pointed wings." In answer to this suggestion of Dr. Jordan's, owing to his references to the opinions of Lord Walsingham and Professor Zeller, the late Mr. Sang wrote a most interesting article differentiating *bertrami* and *dichrodactylus*, and

* *Achillea* is the food-plant of *bertrami* not *Tanacetum*.

pointed out the remarkable fact that "*dichrodactylus* only occurs on *Tanacetum*, although *Achillea* may be plentiful in the same district,"* that "there is a great difference in the tone of colour," that "when specimens of *bertrami* have very falcate wings they are females only and not of both sexes," that "the hollowed outer margin below the apex is of a different shade in the two species," that "the palpi are longer in *dichrodactylus* than in *bertrami*," and that "the spot at the end of the fissure of anterior wings is fainter in *bertrami* than in *dichrodactylus*," "Entomological Monthly Magazine," Vol. XVIII., pp. 143-144. After these practical notes, Mr. C. G. Barrett took up the matter ("Entomologist's Monthly Magazine," Vol. XVIII., p. 177. I must now confess that I do not understand the use of Mr. Barrett's brackets and "=" in the synonymy of the second paragraph, although the paragraph itself is clear enough. In the then (and present) condition of our knowledge, he took up what appears to me to be the only reasonable view of the matter that could be taken, sinking *dichrodactylus*, Mühlig, as a synonym of *ochrodactyla*, Hb., and the *ochrodactylus* of Stainton and other authors as a synonym of *bertrami*, Rössler. He then points out that *bertrami* feeds on *Achillea* in a very different way to that which *ochrodactyla* feeds on *Tanacetum*, and concludes:—"The habits of the larvæ seem certainly to point to the distinctness of these two species." In the "Entomologist's Monthly Magazine," Vol. XXII., pp. 104-105, Mr. Porritt, after describing the larva of *bertrami*, adds:—"It will be noticed from Mr. Buckler's description of the larva of *P. dichrodactylus* ("Entomologist's Monthly Magazine," Vol. XII., 233) that both species correspond in having three forms of colouring in the different stages of growth, and the resemblance of the adult larvæ particularly, shows the close relationship of the two species; whilst the differences, apart from the food-plants, are sufficiently wide to separate them."

Nothing more of importance seems to have been found out, but Mr. South received three larvæ of *bertrami* in June, 1885, from which he bred one imago, July 21st, 1885, and on these slender data Mr. South re-opened the whole question of "two" or "one" species; but as all the arguments adduced had been previously used, and there was no

* Mr. Porritt, "Entomologist's Monthly Magazine," Vol. XXIII., p. 163, dwells very strongly on this point. He writes:—"In the Saltburn ravine, and also all over the district, yarrow was in full bloom, and in equal luxuriance with the tansy, yet not a single specimen of *dichrodactylus* was ever seen frequenting it, or any plant but tansy. *Bertrami* evidently does not occur in the district at all, or we think we must have seen it during our fortnight's stay."

new matter or datum to work on, matters have remained in the same position as before. Personally, with about the same data as Mr. South has to go on, viz.—the breeding of an odd specimen or two of each species—a bred series of Mr. Sang's own specimens of *ochrodactyla*, and a long series of principally caught specimens of *bertrami*, I should be inclined to agree with those who believe in the identity of the two species; but in the face of the intimate knowledge of the late Mr. Sang and Mr. Porritt of both species, and their decided opinions as to the distinctness of the two species, I consider it advisable, for the present, at least, to consider the species distinct, I shall, therefore, deal with them as—

1. *ochrodactyla*, Hb.
2. *bertrami*, Rössl.

(To be continued.)

Note on *Deilephila Galii*.

By W. H. TUGWELL.

I had no intention of again intruding on the pages of the *Young Naturalist* any further remarks on this subject, but Mr. W. E. Sharp, in last month's issue, pp. 203-6, attributes to me views, quite at variance with what I have set forth (pp. 113-5). Mr. Sharp states that I hold that the St. Margaret's Bay imagines are from Continental origin, but that the Cheshire, Irish, and Scotch perfect insects are, or may be, from locally bred parents. Now that to my mind would be ridiculous. What I state and fully believe is, that all the imagines of 1888, and parents of all the numerous larvæ found in England last year, were in all probability from a continental origin, and my reason for stating that is, that there has never yet *been bred in England, from English larvæ* specimens of *D. galii* that are anything like as large and robust as those caught specimens. Not only the 1889 bred examples, but those bred from the 1859 larvæ, or the 1870 larvæ, these are of the same type, small and undersized insects when compared with caught examples. I have in my cabinet specimens of *Galii* bred from Deal, in 1859, by the late Dr. Boswell (Syme); from the Wallasey sand hills, bred in 1870; and have bred 112 from Deal from the 1888 larvæ. I much doubt if five per cent. of the females were robust enough to have produced fertile ova, not a single one attempted to deposit a single ovum. This to my mind settles the question, for it is

idle to doubt the possibility of such an insect as *Galii* being capable of flying from France or Holland to any part of the British Isles.

Now let us just look for a moment at the facts of the case. You will seek in vain, I believe, for any record of *Galii* being taken in any part of England in 1887, and very few indeed, if any, from the year 1870 until 1888; then on the Kentish coast we get some 22, and possibly more imagines captured, *i.e.*, 18, St. Margaret's; 1, Deal; 1, Dartford; 1, Folkestone; 1, Gravesend; and later on larvæ widely spread all over the county. We, too, have records of the moth being captured: 1 in Middlesex, 1 in Buckinghamshire, 2 in Berkshire, 3 in Essex, 2 in Suffolk, Norfolk, 2 in Yorkshire, 2 in Durham, larvæ plentiful in Cambridgeshire, 2 in Cheshire, 3 in Lancashire, with two specimens in Scotland, and one in Ireland. So we see that in Kent we get a much greater number of caught specimens than elsewhere, and from here they spread out until Scotland and Ireland are reached by a few, although from neither place do we hear of larvæ being found.

The species was found either as larvæ or moths in greater or lesser numbers in most of the North-Eastern counties, whilst in some of the Midland counties, as Cambridgeshire, the larvæ were reported in some numbers. Then on the North-West, in Cheshire and Lancashire, a few imagines and many larvæ are recorded. The insect does not appear to have been recorded from the extreme South-West counties or Wales. Now, Mr. Sharp seems to think it beyond strange that a migratory insect should be able to attain so distant a spot from the Continent as the Wallasey sand-hills. This to me is by no means an insuperable task. No one presumes that this flight is one straight and continuous effort, but would be reached by probably an instinctive daily progression in a certain direction. (*Migration of lepidoptera is too well authenticated to be doubted*). Certain well-known species have, by their migratory roving habit, become almost world-wide in their range; several of the large Hawk-moths being of this kind.

Just a few words on the Deal and Wallasey sand-hills being noted localities of *Galii*. The reason to my mind is that the nature of the ground not only produces abundance of their principal food, *Galium verum*, but collectors can much more readily find the larvæ there, than in a densely grassy place. The bulk of the larvæ are perhaps traced up by their black frass, easily seen on the brown sand, so that I quite believe that a much greater relative number would be discovered on sand-hills. The larvæ might be quite as numerous in many places,

but less likely to be found than on the sparsely covered growth of the sand-hills.

Mr. Sharp fails to see how I can agree with his previous paper *Young Naturalist*, pp. 97-9. He there says, "The forces arrayed against immature life are as complex as they are variable. We have first the weather, then the effect of other animal life, then the influence of plant life, and these three so interact, and are so mutually dependent and contingent, &c." This I fully endorse, but I also believe that the erratic appearance of *Galii* in England is due to the fact that it cannot live and thrive here, and is only to be found after a migration of that insect to this country, such as 1859, 1870, and 1888. What causes this migration, what instinctive motive brings it about, we are powerless to and unable to comprehend.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

October 2nd, 1889.—The Right Hon. Lord WALSLINGHAM, M.A., F.R.S., President, in the chair. Mr. Arnold Umfreville-Henn, of Heaton Chapel Rectory, near Stockport, elected a Fellow.

Mr. F. P. Pascoe exhibited a number of species of insects of all orders, collected by himself during the past summer at Brindisi, and in Greece and the Ionian Islands.

Mr. J. W. Douglas sent for exhibition specimens of *Lygus visicola*. Puton, a species new to Britain, taken at Hereford, in September last, exclusively from mistletoe, by Dr. T. A. Chapman.

Mr. R. M'Lachlan exhibited nearly one hundred species of Trichoptera recently collected in Iceland by Mr. P. B. Mason. Only six species were represented, and of these, five had been previously recorded from the island. He remarked on the great amount of variation existing in some of the species.

Mr. E. B. Poulton exhibited a mounted specimen of the yellow powder from the cocoon of *Clisiocampa neustria*, under a power magnifying 188 diameters. The powder was thus seen to consist of crystals so minute that the form could only just be made out. He said the powder was present in a crystalline form in the malpighian tubes, and was discharged from the anus of the larva. A discussion ensued as to the functions of the malpighian tubes, &c., in which Mr. Stainton, Lord Walsingham, Mr. M. Jacoby, Mr. P. B. Mason, Mr. M'Lachlan, and Dr. Sharp took part.

Mr. Poulton also exhibited some photographs of living larvæ of *Hemerophiha abruptaria*, showing different depths of colour which had been induced by experiment; specimens of the larvæ preserved in spirit were also shown, together with water-colour representations of two varieties. He said that, as in other experiments of the kind, the larvæ had been rendered very pale by being surrounded by green leaves

and stems only, whereas they became extremely dark when numbers of dark twigs were intermingled with the leaves of the food-plant. All were bred from eggs laid by the same female.

Mr. F. Merrifield said that Dr. Chapman had recently obtained similar results from experiments on the larvæ of *Ennomos alniaria*.

The Rev. Dr. Walker exhibited, and read notes on, a number of Coleoptera, Neuroptera, Hymenoptera, and Diptera, which formed the second instalment of the collection he had recently made in Iceland.

Mr. R. South exhibited a specimen of *Luperina testacea*, bred from a pupa found at the root of a species of *Silene* at Esstbourne; also a specimen of *Luperina Nickerlii*, caught in Lancashire last August. He also exhibited, and read notes on, a long series of *Boarmia refandata*, bred from larvæ collected in North Devon. Mr. Poulton, Mr. Merrifield, and Lord Walsingham took part in the discussion which ensued.

Mr. J. J. Walker, R.N., exhibited a number of Coleoptera collected during the past summer in Cobham Park, Kent. Thirty-three species were represented, amongst which were the following, viz., *Eros minutus*, *Philonthus fuscus*, *Homalota hepatica*, *Abræus granulum*, *Anisotoma grandis*, *Agaricophagus cephalotes*, *Thalycra sericea*, *Cryptophagus ruficornis*, *Platytarsus setulosus*, &c. He also exhibited a living larva of *Helops carvæus*.

Mr. Jacoby exhibited a curious Phytophagous beetle found by Mr. J. H. Leech in the Corea. He stated that he was unable to determine the genus, as was also Mr. J. S. Baly, to whom he had submitted the specimen,

Mr. R. Adkin exhibited specimens of *Retinia resinella*, received by him from Forbes. Lord Walsingham remarked that he had never seen the species in Scotland, but that it was not uncommon in Germany, and he had found it at Hamburg.

Mr. W. Dannatt exhibited a male specimen of *Papilio Antimachus*, Drury, from Lukolela, a missionary station about 500 miles from the mouth of the Congo. He stated that the species, although very rare, had a wide range, as three other specimens of it had been received from the Stanley Falls, which were more than 800 miles further up the Congo.

Lord Walsingham exhibited preserved specimens of the larva and imago of *Cidaria reticulata*, from the Lake District, sent to him by Mr. Hodgkinson.

Mr. W. White stated that as some doubt had been expressed at the last meeting as to whether the specimen of *Nephronia hippia*, Fab., var. *gæa*, Feld., which he then exhibited, was hermaphrodite, he had, with Mr. Griffith's permission, handed the specimen to Mr. G. T. Baker for dissection.

Mr. J. Jenner Weir exhibited fore wings of the males of *Argynnis Paphia*, *A. Adippe*, and *A. Atlantis*, denuded of the scales, in order to show that there was no dilation or thickening of the median nervules and sub-median nervure in that sex of these species; but that the apparent dilatation was produced by a dense mass of scales crowded together on each side of the nervules. He also read a short paper on the subject entitled, "Notes on the nervules of the fore wings in the males of *Argynnis paphia* and other species of the genus."—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

September 19th, 1889.—Mr. J. A. CLARK, in the chair. Mr. Milton exhibited a variety of *Plusia gamma*, having a bright crimson blotch in the centre of either forewing. Mr. Clark, a bred series of *Pædisca semifuscana*, from the North of Ireland, showing considerable variation. The absence or scarcity of several species of lepidoptera during the present season was commented upon, *Vanessa atalanta* being specially mentioned as an example. Mr. Boutell brought up a quantity of lepidoptera for distribution among the members. Mr. Heasler exhibited *Tabanus autumnalis*, and three brilliant carabus beetles from Switzerland. Mr. Milton, several specimens of Hemenoptera, Orthoptera, Lepidoptera, and Coleoptera. Mr. J. A. Clark, a variety of coleopterous species; *Serica brunnea* being the most noticeable.

October 3rd.—Mr. J. A. CLARK in the chair. Mr. Allbuury exhibited a series each of *Bryophila perla* and *glandifera*, the first named included some pretty varieties; also a series of *Polia chi*. Mr. Bellamy, *Agrotis suffusa* and *Anchocelis lunosa*. Mr. Goldthwaite, a case of insects taken in Belgium, containing among others *Callimorphahera*, *Vanessa antiopa*, and *Fidonia conspicuata*. Mr. Clark, *Argynnis aglaia* from the New Forest, and a bred series of *Triphæna orbona*, from Ireland; he remarked that the latter species was totally different from the Scotch specimens he had bred, and closely resembled the type taken in the neighbourhood of London. Mr. Battley read a list of species of lepidoptera he had taken in Epping Forest during the year, from January 1st up to present date. In Coleoptera, Mr. Newbery exhibited a box of specimens received from Mr. R. Gillo, of Bath, including a very fine series of *Nebria complanata* and *Pelobius hermanni*. Mr. Heasler, a quantity of aquatic species, among which were *Ilybius fenestratus*, *Helophorus dorsalis*, *Hydroporus geminus*, *H. dorsalis*, and *H. lituratus*. Mr. Allbuury, a quantity of beetles from Kent, principally *Carabidæ*, also a long series of *Rhagium inquisitor*, *Dascillus cervinus*, &c. Mr. Lewcock commented on Mr. Newbery's exhibit, stating the circumstances under which Mr. Gillo captured his *Nebria*, and, also referred to the squeak of *Pelobius* when removed from the water. He had taken several specimens of this insect at Walthamstow in the early part of September, and kept them alive in a bottle for several days, the "squeak" being heard quite plainly when the beetles were handled. Other members also remarked on the insect.—G. A. LEWCOCK and E. HANES, Hon. Secretaries.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

September 26th, 1889.—T. R. BILLUPS, Esq., F.E.S., President, in the chair. Mr. J. T. Williams exhibited *Cucullia absinthii*, from Portland. Mr. Wellman, *Plusia orichalcea*, and *Dasydia obfuscaria*. Mr. Jager, lepidoptera from the lake district and the Isle of Man; among those from the last named place were some interesting forms of *Polyommatus phlæas*, and a small dark forms of *Pieris napi*, which species Mr. Carrington said was usually dark in that locality. Mr. Carpenter, *Gnophos obscuraria* and varieties of *Bryophila glandifera* from Folkestone. Mr. Tugwell, a long series of

varieties of *Peronea hastiana*, bred from larvæ collected at Bræmar, Aberdeen. Mr. Ince, lepidoptera from Switzerland. Mr. R. Adkin, a series of *Hypermercia angustana*, bred from larvæ found feeding in shoots of willow, collected in county Derry, Ireland. The specimens shewed considerable variation, some having the ground colour of the primaries silvery and the usual reddish-brown central fascia and costal patch intensified, while in others the colours of these markings was almost entirely replaced by dull grey; and, from the same locality *Pædisia semifuscana*, which also shewed variation, both in the colours and markings of the specimens. Mr. Jenner Weir, chrysalides of *Pieris napi*, to shew that, although their colour was very much affected by the environment of the caterpillar at the time of their metamorphoses, yet, in no way did they approximate to that of their surroundings; they were all the produce of one female of the species; those that had changed to chrysalides in an ordinary breeding case with perforated zinc sides were of a dull cream colour with black spots, and those that had metamorphosed in a tin gentle box with the usual perforations at the top were of a beautiful apple green with black spots; they had all been reared from the egg and fed up in a breeding cage, and that those had become chrysalides in the gentle box had been placed there a few days before. A discussion ensued, Messrs. Carrington, Tugwell, White, South, Auld, and Weir taking part. Mr. Turner exhibited a varied series of *Triphana pronuba*, and said that he was in doubt as to which was the var. *innuba*, but that the variation of the species was similar to that of *T. orbona*. Mr. Billups on behalf of Mr. Tearoe, *Apantales jucundus*, from Deal.

October 10th, 1889.—The President in the chair. Mr. Weir remarked that at the last meeting he exhibited chrysalides of *Pieris napi*, when it was thought by some of the members that the apple green specimens would, if placed in a strong light, lose their colour, he now exhibited the same chrysalides which he had exposed for weeks to the direct rays of the sun without the slightest fading in the green colour. Mr. Wellman, light forms of *Gnophos obscuraria*, from Lewes, and it was stated that this light form was only to be met with in that locality, but Mr. Tutt remarked that he had taken one example at Folkestone. Mr. South referring to Mr. Turner's query as to *Triphana pronuba* and its var. *innuba*, stated that in the var. the wings and thorax were unicolorous; he also exhibited a variety of *Luperina testacea* and a specimen of *L. nickerlii*, the latter received from Mr. Baxter, of St. Ann's-on-Lea, Preston; also a long series of *Triphana orbona*, and read notes on the markings of the secondary wings. Mr. Carpenter, *Pterostoma palpina*, from Essex, and *Heliophobus popularis*, taken at Streatham. Mr. Oldham, several species of lepidoptera from the Cheshire Mosses. Mr. R. Adkin, examples of *Ellopiæ fasciana* and *Boarmia abietaria*, and referring to the view held by some entomologists, that larvæ fed upon one particular plant would not readily take to another, said that the larvæ of the last-named species were obtained from fir and were at first fed upon fir and yew, but upon some birch being put into the cage they immediately left the other two plants and fed exclusively upon it. Messrs. Carrington, Tugwell, Cooper, Weir, South, J. A. Clark, and others made observations relative to this subject. Mr. Adye, a specimen of *Sphinx convolvuli*, taken at Christchurch. Mr. C. A. Briggs, an albino form of *Epinephela tithonus*. Mr. Cooper, a bred series of specimens of *Deilephila galii*, and in reply to Mr.

Tugwell stated that he had not been able to find any larvæ of this species during the autumn. Mr. Tugwell said that this agreed with his experience. Mr. T. R. Billups, a living specimen of *Gryllotalpa vulgaris*, from Poole, and contributed notes. Mr. Frohawk, light and dark forms of males of *Calopteryx virgo*, from the New Forest and *C. splendens*, from Ipswich. Mr. Turner, some interesting specimens of *Lycana icarus*, from Folkestone. Mr. Step, coleoptera, from South Africa. Mr. Fremlin, grass to which a number of flies had become attached. Mr. Cook, two examples of the mole (*Talpa Europæa*), one of which was an albino, from Essex. Mr. Cooper remarked that albino specimens of the mole were not at all uncommon in the county of Norfolk, he had this year had four offered him and a greater number in the preceding, he had also found a dead one in Finbury Park. Mr. C. A. Briggs, an example of the fish *Coregonus oxyrhynchus*.—H. W. BARKER, Hon. Secretary.

Notes and Observations.

C. CELERIO AT WEST HARTLEPOOL.—On October the 1st, I had brought to me a specimen of the above insect. It was taken at rest on the framework of a greenhouse by a little boy, the son of Mr. W. G. Clarke, of Bellerby Terrace, near here. The tips of the upperwings are slightly "rubbed," otherwise, its condition under the circumstances of capture, is very fair.—A. WOODS, 10th October, 1889.

DEILEPHILA GALII.—One larva of *D. galii* has been met with here this season.—S. WEBB, Dover.

DEILEPHILA GALII AT WALLASEY.—It is reported that five larvæ of *D. galii* have been taken, but the matter is somewhat doubtful, for nine, that were previously reported, turned out on examination to be only *M. stellatarum*, which has been plentiful.—F. N. PIERCE, Liverpool.

ACIDALIA INORNATA.—I have only twice met with this species here, once last year and once this year. On both occasions the specimens were sitting exposed to the full glare of the sun, but so little affected thereby that they allowed me to box them as they sat. I thought the first time I saw them it was curious, and was more than astonished when I met with the insect again under the same conditions, which seemed very unnatural, especially as there was abundance of shelter. The place is a few miles away, and not convenient for night collecting, I have not, therefore, had the opportunity of taking it on the wing.—J. E. ROBSON, Hartlepool.

I believe *Acidalia inornata* is more common about York than is generally supposed. It flies principally just before dark, or I might

say, before dusk. We are then engaged with our sugar, and as we have a stretch of ground over a mile long, with splendid trees on each side, which have been regularly sugared for over 20 years, we have not time for taking it on the wing. When I have given attention to it, I have taken it not uncommonly, along with the much commoner *A. aversata*.—WM. HEWETT, 3, Wilton Terrace, York.

COLIAS EDUSA.—This species has occurred here this season. I took three during the latter part of August.—LOUIS MEADEN, 15, Elm Grove, Brighton.

Colias edusa has occurred here in fair numbers. I hear of some 20 specimens falling to the net of local collectors. One youth had six or seven males and one female. It had not been observed here since 1877, the great *Edusa* year.—F. N. PIERCE, Liverpool.

In connection with the occurrence of *C. edusa* in England this year, it may be interesting to note that on July 30th, while sailing about 30 miles off the coast of Brittany, I saw three specimens of this butterfly being carried by the wind in a north-westerly direction.—GEO. A. HARKER, 100, Huskisson Street, Liverpool.

ACIPTILIA PALUDUM.—My sons and I duly worked the locality every favourable evening throughout August, and on the last but two or three I caught two *A. paludum* in fine condition. These were the only ones found during the whole month. I was glad to see them, as otherwise, not having seen even one in 1888, I should have almost concluded that it was extinct. I look forward to it again turning up in some future season, as freely as in 1886-7, but there is no hazarding even a guess on these matters. I wish we could find the larva or pupa! Unfortunately we did not make a serious search for these in either of the two years when the imago was abundant, and of course in 1888-9, when the imago was almost *non est*, our search for larvæ, &c., was little likely to be successful.—(Rev.) O. P. CAMBRIDGE, Bloxworth, 10th October, 1889.

CEROSTOMA LUCELLA.—I have never known so bad a season as the past for lepidoptera, and yet in the first week in June, for a few days, I have rarely seen so many, both species and individuals, of micros of all kinds, as I saw here in our woods. From that time, almost everything has been rare, and multitudes of the commonest moths have not appeared at all. The only good thing I got was about a score of *C. lucella*, between July 9th and September 1st, and these were all, with two exceptions, beaten from one large oak bush.—(Rev. O. P. CAMBRIDGE, Bloxworth Rectory.

SPHINX CONVULVULI.—A specimen of this insect was brought me on the 9th September, which had been found sitting on the lawn in the morning. There were several attractive flowers in the garden including tobacco.—J. C. WARBURG.

A few *Convolvuli* have occurred about Liverpool this season.—F. N. PIERCE, Liverpool.

A few specimens of this insect have appeared here the last few nights. I only succeeded in capturing three. The first on the evening of 20th August. I saw several more, but the bats swooped down whilst I waited a favourable opportunity. I did not observe they ever captured *Convolvuli*, but they spoiled my sport, and brought forth an execration against bats in general.—J. MASON, Clevedon Court Lodge.

NOCTUÆ AT SUGAR.—The following are the species obtained by sugaring at Chislehurst, in August and the beginning of September:—*Xanthographa*, many; *Nictitans*, *Oculea*, *Trapezinea*, many, varying much; *Pyramidea*, much scarcer than other years; *Pronuba*, *Tragopogonis*, *Orbona*, *Baja*, five or six; *Brassicæ*, very few, generally a perfect nuisance; *Citrigo*, much commoner than usual; *Nigricans*, one; *Diluta*, common one night; *Meticulosa*, one; *Rostralis*, a few. All the above in four or five nights.—J. C. WARBURG.

VARIETY OF HADENA PROTEUS.—I took a beautiful variety of *Hadena proteus* at sugar on the evening of September 14th. It is evidently the same form as the lowest figure in Newman's work, but with the white markings more pronounced.—J. MASON, Clevedon Court Lodge.

THE CRIMSONS IN THE NEW FOREST.—I spent one evening with two friends sugaring in Ramnor enclosure, and our experience on that occasion was enough to satisfy us that neither *Promissa* nor *Sponsa* were to be lured by sugar in anything like the usual numbers. I took three fine *Sponsa* and missed one *Promissa*. My friend saw one *Sponsa* only. I met Mr. Chas. Gulliver, who told me he had heard of three *Crimsons* being taken at Hurst Hill.—W. McRAE, Bournemouth.

The result of sugaring for the *Crimsons* was exactly what might have been expected from the scarcity of their larvæ.—A. ROBINSON, Brettanby Manor, Darlington.

ERRATIC APPEARANCE OF LEPIDOPTERA.—As I am anxious to collect all the evidence possible on the phenomenal abundance or scarcity of certain species of lepidoptera, I shall feel very grateful for any information of the particular years of such abundance, which entomological

readers of this paper can supply me with, from notes, diary records, &c., since the year 1850. The species selected are *Daphidice*, *Edusa*, *Antiope*, *Carduii*, *Galii*, and *Livernica*, and I shall be glad to receive any such information, either through the medium of this magazine or direct. The results of this investigation will in due course be published.—W. E. SHARP, Hallwood, Lidsham, Chester.

[Mr. Sharp will find very full details of the occurrence of the four of the first-named, in Mr. Dale's "History of the British Butterflies," published as a Supplement to the *Young Naturalist*.—ED. Y.N.]

On the Lepidoptera of Ireland.

By C. S. GREGSON.

The following list of the lepidoptera collected by my friend, Mr. E. R. Curzon, in the counties of Antrim, Derry, Dublin, and Galway, during the summer of 1889, will be interesting to those who are studying the fauna of that country. I have appended a few remarks to the more interesting species, and would call special attention to the large number of species taken.

Pieris

brassicæ.

rapæ.

napi. Feeding on watercress (*Nasturtium officinale*); many specimens taken, all large and mostly very dark.

Vanessa

urticæ.

Satyrus

egeria. Large and dark; very fine.

megæra.

semele. From County Derry; very bright coloured.

tithonus.

hyperanthus. Large.

Chortobius

pamphilus. Fine.

Polyommatus

phlæas.

Lycæna

alexis.

alsus.

Smerinthus

populi.

Hepialus

velleda. Dark.

Var. carnus. Beautiful.

humuli.

Zygena minos. A fine series. The good specimens are what we call *Nubigena*, the bad ones represent what was called *Minos*: all are *Minos*. I compared them carefully with my rather long series of *Minos* in my continental collection, from Zeller, Ragonot, &c.

filipendulæ.

Chelonia

caja.

Arctia

lubricipeda.

menthastri.

Eriogaster

lanestris.

Bombyx

quercus.

Saturnia

carpini.

Rumia

cratægata.

Metrocampa

margaritata.

Ellopiæ

fasciaria.

Selenia

illunaria.

Odontopera

bidentata. Very large, two females especially so.

Crocalis

elinguaria.

Nyssia

zonaria. In profusion. Very large and distinctly marked.

Several specimens with odd wings, one side normal the other wanting, or with extra zonale markings. A new locality for this species, County Antrim, March and April.

Boarmia

repandata. Only one specimen taken, bred from pupa found under a stone ; it is, without exception, the darkest and the handsomest specimen I ever saw of this variable species.

Pseudopterpnæ

cyniaria.

Ephyra

tulineaia.

Acidalia

promutata.

subsericiata.

aversata.

Cabera

Pusaria.

Macaria

liturata.

Strenia

clathrata.

Numerea

pulveraria. Suffused smoky forms.

Fidonia

atomaria. Large dark specimens.

Aspilates

gilvaria. Large. The only Northern specimens I ever saw.

Abraxes

grossulariata. Ordinary forms only.

Hybernia

defoliata.

Larentia

didymata. Very large.

multistrigata.

cæsiata

salicata. This was on the sand hills just above tide mark, and was double-brooded ; the first brood darker than the second, and less silvery steel colour. Mr. Curzon sent me eggs, the larvæ from which I am now feeding upon growing white ladies bedstraw, the natural food *Salicata* lives upon ; on the Irish sand hills, County Derry, it is the yellow gale *G. verum*.

pectinata

affinitata. These are like or approach the series in Mr. Webb's collection bred by me from seed heads of the red catchfly (*D. urticæ*) gathered on my rabbit warren at Formby, Lancashire coast, and are var. *unicoloræ* devoid of the light strigæ.

alchemillata. Only one specimen brought. It is a rufous coloured variety—that is, all the higher parts of the wings are reddish brown, and if this form proved more than a sport it might very properly be called var. *russata*. There is a specimen in Mr. Webb's collection approaching it, but lighter.

albulata

decolorata.

Eupithecia

venosata. Some of these are more strongly veined and marked than any I have ever seen. They are superb forms.

centaureata.

satyrata. Large broad forms.

castigata.

abbreviata.

exiguata.

Thera

firmata.

Ypsipetes.

elutata.

Melanthia.

rubiginata.

occellata.

Melanippe

montanata.

galeata. Fine well-marked lightish forms.

fluctuata. One large specimen.

Anticlea

badiata.

unidentata.

Camptogramma
 bilineata.

Scotosia
 dubitata.

Cidaria
 miata.
 corylata.
 immanata. One of which is a peculiarly distinctly banded
 variety. There is nothing strikingly differing from
 other localities, except this.

 suffumata.
 populata.
 fulvata.
 pyraliata.

Eubolia
 mensurata.
 palumbaria.

Anaitis
 plagiata.

Diloba
 cœruleocephala.

Thyatira
 derasa.

Cymatophora
 duplaris.

Acronycta
 psi.
 rumicis.

Leucania
 littoralis.
 impura. Dark.
 pallens.

Hydroëcia
 nictitans.
 micacea.

Xylophasia
 rurea.
 polyodon. All small, and mostly light brown; markings faint,

Charæas

graminis.

Cerigo

cytherea. Very dark.

Luperina

testacea.

Mamestra

albicolon.

furva. So fine and dark, that I had to look twice at these mountain insects taken on the coast.

Apamea

oculea

Miana

strigilis.

literosa.

captiuncula.

Caradrina

alsines.

blanda.

These were so fine, and packed so closely upon each other, that I was unable to examine them critically, as the best character to separate them by is in the *under wings*, which could not be seen under the circumstances.

cubicularis.

Agrotis

valligera. Fine.

suffusa. Very strongly marked.

saucia. beautiful.

lunigera.

cursoria. Very poorly marked.

nigricans.

tritici. *All* very fine. Several my var *obeliscoides*. Many might be mistaken for *obelisca*, but the under wings say distinctly "*tritici*" to the critical differentiator.

præcox. Fine and blackish.

Tryphæna

orbona.

pronuba.

Many bred. No striking forms.

Noctua

glareosa. Same remarks apply.

festiva.

xanthographa.

Tæniocampa

stabilis.

Orthosia

lota. Only one specimen. It is a rich reddish brown, outer lines broad bright red, and is the only variety of *lota* I ever saw.

Anchocelis

rufina.

litura.

Xanthia

cerago.

silago.

ferruginea.

Dianthæcia

carpophaga.

var *capsophila*. very large and dark.

cucubali.

conspersa.

barrettii. fine. All the *Dianthæcia* were taken at Houth, Co. Dublin.

Hecatera

dysodea.

Polia

chi.

Epunda

lutulenta

variety *lunburgensis*. A grand series.

variety *sedi*. About one in six of the preceeding variety but all the variety *sedi* are particularly well marked.

nigra

lichenea.

Miselia

oxyacanthæ.

- | | |
|--|--|
| <p>Agriopis aprilina, Phlogophora meticulosa. Hadena adusta. protea. dentina. oleracea. pisi. Cuculia chamomillæ. umbratica. Plusia chrysitis. iota. v-aureum. gamma. Amphipyra tragopogonis. Mania typica. maura. Stilbia anomala. Very large and fine as bred. Hypena proboscidalis. Rivula sericealis. Pyrausta purpuralis. ostrinalis. Rhodaria sanguinalis. Very abun- dant in Co. Derry. Herbula cingulalis.</p> | <p>Botys fuscalis. Ebulea crocealis. Scoparia ambigualis. cembrae. muralis. lineolalis. cratægella. angustea. Crambus pratellus. pasculellus. pinetellus. perlellus. tristellus. geniculellus. culmellus. hortuellus. Homœosoma saxicola. Phycis carbonariella subornatella Tortrix rosana. viburnana. icterana viridana. ministrana. Amphysa walkerana. Peronea variegana. hastiana. ferrugana.</p> |
|--|--|

aspersana.
 Teras
 caudana.
 contaminana
 Dictyopteryx.
 holmiana
 bergmanniana
 Penthina.
 cynosbana
 Spilonota
 amænana
 Sericoris
 litorana.
 cespitana and a series al-
 lied to it, if not a per-
 manent smoky variety
 of it.
 lacunana.
 urticana.
 Roxana
 arcuana.
 Cnephasia
 lepidana
 Sciaphila
 subjectana.
 alternana.
 colquhounana (bred) a
 fine series.
 Sphaleroptera
 ictericana
 Clepsis
 rusticana.
 lanceolana
 Phoxopteryx
 biarcuana.
 Grapholita

nigromaculana
 Ehippiphora
 cirsiana.
 Stigmonota
 perlepidana.
 Dichrorampha
 petiverana.
 ulicana.
 plumbagana.
 Catoptria
 scopoliana.
 Xylopoda
 fabriciana.
 Eupcecilia
 albicapitana.
 maculosana.
 angustana.
 ruficilliana.
 Argyrolepis
 badiana.
 Conchylis
 dilucidana.
 Aphelia
 pratana.
 Solenobia
 obconicella, *Mihi. N. S.*
 Cases found by me many
 years ago at Houth and
 bred generally but no
 males ever appear-
 cd. Mr. Curzon
 searched for them and
 found plenty but only
 bred females. I have
 some now hibernating.
 Diplodoma
 marginepunctella.

Tinea

rusticella.

tapetzella.

confusella ?

Incurvaria

musculella.

oehlmanniella

Micropteryx

calthella.

seppella.

unimaculella

subpurpurella

Swammerdamia

pyrella.

Plutella

annulatella a fine series

bred.

dalella.

Harpipteryx

nemorella

Depressaria

arenella.

ocelella.

aplanella.

rotundella.

douglasella.

badiella.

Gelechia

ericetella.

terrella.

desertella.

artemisiella.

senectella.

domesticella.

leucomelanella

marmorella.

tæniolella

anthylledella.

Dasycera

sulphurella.

Æcophora

flavifrontella.

pseudospretella

Butalis

grandipennis.

fuscocuprella.

Elachista

rhyncosporella.

elochariella. This is the species sent out from Preston many years ago as *gregsonii*. It is a little known, but very distinct species, and feeds on the grass it is named from.

collitella

cygniperlella.

I was much pleased to go through this interesting collection of Lepodoptera from Ireland, and noted with surprise *N. Zonaria*, *R. Sanguinalis* and *S. Amænana*, three species often thought to be almost confined to our coast, should be in profusion on the Irish coast, and that *C. Salecalis* and *A. Walkerana* two species generally thought mountain species, should be in plenty just above high tide mark in County Derry.

October, 1889.

COLLECTING AT LOCH RIDON, KYLES OF BUTE,
IN JULY, 1889.

All scarlet and purple ; the sun smiled a splendid adieu, spreading gracious veils of gold gleams among the clouds as he journeyed away to another land. Nature's mantle was decked in her choicest hues, blended and sweetened after her own peculiar manner.

It was about eight o'clock. I had just refreshed myself with a nice tea after my journey from Glasgow, and was standing at the front of the house taking stock of the surroundings. I had come to spend my holidays with the family at Loch Ridon (a beautiful little loch) opening into the Kyles of Bute, It is about four miles in length, and a mile in breadth, very narrow at the mouth, which gives it more in appearance to an inland lake than an arm of the sea. Upon both sides it is bounded by hills varying from 1,000 to 1,500 feet in height, with beautiful wooded sides and softly rounded summits. At the head of the loch the river Ruel threads its way through a meadow, dotted with woods of silver birch, oak, and alder.

We were staying at Feorline, a pretty little cottage occupied by Mr. Galbraith, the gamekeeper of the district. It was well situated on the loch side and commanded a magnificent view. At one end of the house were the kennels, with about a dozen dogs in them. Nailed upon the woodwork were several specimens of Buzzards, Kestrels, and Hooded Crows, also cats' and ferrets' tails, and other animals injurious to game.

Not much was done in the way of collecting, that evening, Saturday, 6th July. A few specimens of *Eupithecia vulgata*, *E. satyrata*, *Acidalia aversata*, *Coremia propugnata*, *Cidaria populata*, and one *Aplecta nebulosa*, were all that fell to the net. *Rumia cratægata* and *Hepialus humuli* were flying about the hedge at the foot of the garden in considerable numbers.

Sunday was pleasant, but rather showery, to venture far from the house. *Pieris brassicae*, *P. rapæ*, and *P. napi* were flitting about the garden ; and *Satyrus janira*, *Lycæna alexis*, and *Chortobius pamphilus*, were everywhere to be seen.

On Monday evening I went up to Tamuich Burn, better known as the Barons Burn; at the head of the meadow. *Hebialis hectus* was hovering over the brackens in the wood; *Melanippe subtristata* and *Camptogramma bilineata* were very common, and a few worn types of *Cabera pusaria* and *C. exanthemaria* were still on the wing; two nice specimens of *Acidalia bisetata* were captured; also some pretty varieties of *Larentia pectinitaria*, *Ysipetes elutata*, and *Cidaria russata*. My brother (who was also furnished with a net) collected principally in the vicinity of the garden. This evening he boxed a fine *Plusia iota*, and one *Abrostola urticae*.

Tuesday evening we collected at the foot of the garden. *Plusia iota* was again caught; also a couple of *P. chrysitis* in fine condition; and many other common Noctuae, such as *Xylophasia rurea*, *X. polyodon*, *Apamea oclea*, *Caradrina cubicularis*, and *Noctua plecta*.

On Wednesday forenoon I followed up the course of a little stream, beating the heather and bushes by the way. *Cidaria populata* was fairly common, and an occasional specimen of *Coremia propugnata* could be dislodged; a few *Melanippe montanata* also rose, this very common geomoter is by no means plentiful in this locality. I found a Rock Wren's (*Troglodytes parvulus*) nest, with five eggs, built on a bank.

Thursday was very wet, so nothing was done in the collecting line. About six o'clock my cousins arrived from Glasgow to spend their holidays, one of whom is a brother of the net and pin.

On Friday evening—in company with my cousins—we went to explore the meadow, near the top of which we discovered *Phibalapteryx lignata* in fair condition flying about a marshy piece of ground. After boxing a good series we entered a wood; *Metrocampa margaritata* was very common, as was also *Hebialis hectus*, and many other common geometers. It was now getting dark, so we took to the outskirts of the wood where we caught a few *Melanthia rubiginata*, *M. ocellata*, *Cidaria corylata*, *C. immanata*, and *C. russata*; single specimens of *Noctua augur* and *N. umbrosa* were boxed; but the most important capture of the evening was a fair type of *Plusia bractea*, which I netted as it hovered over the flowers of a bramble.

Saturday being Glasgow Fair holiday, a few friends had come down on Friday night to wait over till Monday. It was therefore arranged

we should have a pic-nic on Saturday; so, shortly after breakfast, we set out towards the head of the meadow. Much amusement was caused by several *Vanessa urticae*. Mr. Brownlie—who carried my net—seemed to fancy their gay colouring as he pursued one which took him over many a fence and burn before he effected its capture. Two or three *Lycæna alexis* and *Chortobius pamphilus* were taken, and a few worn specimens of *Erebia blandina*. We pitched our camp by the side of the Barons Burn, and then set out to enjoy ourselves, leaving the old folks to prepare the eatables. There is a fine waterfall here, which falls about thirty feet; any quantity of ferns grow, among which a few roots of the Holly Fern (*Aspidium lonchitis*) were discovered. I may also mention here that my brother found Wilson's Filmy Fern (*Hymenophyllum Wilsoni*) growing in two or three places in the locality, while Beech Fern (*Polypodium phegopteris*), Oak Fern (*Polypodium dryopteris*), and Black Spleenwort (*Asplenium adiantum nigrum*), and half a dozen more were common. After tumbling about the glen for some time we returned to lunch, which was got over not without some annoyance from the quantity of wasps which were attracted to the spot by the smell of jelly and something stronger.

When we had refreshed ourselves we made for the heather, hoping that some insects would be on the wing. Two or three *Tortrix vibernana*, *Crambus margaritellus*, *Pterophorus trigonodactylus*, and *Catoptria hohenworthiana* were all that were caught. We then rejoined the company, and after singing a few songs with good ringing choruses, turned our faces homewards. By the roadside I found a freshly emerged specimen of *Crocallis elinguaris* sitting on a grass stem.

On Monday evening we revisited the meadow; when going through a clump of whins a bird flew out, and after a careful search the nest was discovered, and turned out to be a Whitethroat (*Sylvia cinerea*) with three eggs. A few more *Phibalapteryx lignata* were boxed; single specimens of *Emmelesia albulata* and *E. alchemillata* turned up. *Crambus pratellus*, *C. tristellus* and *Scoparia dubitalis* were everywhere; and some nice varieties of *Cidaria immanata* and *Larentia pectinitaria* were captured. *Triphæna orbona* and *T. pronuba* were fairly common, and many others before mentioned.

Tuesday evening we collected principally by the roadside near the manse. *Hepialus sylvinus* was dashing about with great speed along with its easier going relative *H. hectus*; a few *Acidalia bisetata* were

caught; one solitary type of *Eubolia palumbaria*, and several *Dictyopteryx uliginosana*, *D. læflingiana* and *Tortrix ribeana* were taken.

On Thursday afternoon we climbed one of the hills which look down on the loch; though the ascent was fatiguing, the toil was well repaid by a scene of loveliness—the extensive prospect, the wild mountain passes, and the little streams that gushed and sparkled among the rocks. Below us lay the Kyles of Bute calm as glass, the islands of Bute and Arran, and still further the pale blue coast of Ayrshire vanishing into distance. After having rested we commenced the descent on the south side of the hill. In one corner we came across *Larentia cæsiata* and *L. didymata*, but they were easier seen than captured, as the hill at this part rose nearly perpendicular; therefore, to chase them was entirely out of the question, notwithstanding a good number were netted as they rose from the rocks. *Argyresthia brochella* was very common on the birch; single specimens of *Gracilaria alchimiella*, *Orthotænia antiquana*, and *Crambus pinetellus* were beaten from the undergrowth, and *Sericoris lacuana* was common everywhere.

In the evening we collected by the roadside near the house. A goodly number of Noctuæ were on the wing; a couple of *Plusia pulchrina* came first, then single specimens of *P. chrysitis*, *Epunda viminalis*, *Agrotis segetum*, and *Eupithecia fraxinata*: *Leucania impura* was for ever trying to get into the net; and *Miana arcuosa*, and *Mamestra brassicæ* were common.

On Friday forenoon I went up Ard-a-Chapnill glen. A few *Erebia blandina* were flying about; here I boxed a worn *Plusia interrogationis*. I then commenced beating among the stunted bushes and heather which overhung the stream; this produced two fine *Coremia munitata* and a few *Eupithecia nanata*, *Larentia olivata*, *Cidaria fulvata*, and *Larentia cæsiata*.

In the evening, with my cousin, we started for Glendaruel; but, rain coming on, we got no further than the bridge at the foot of the glen. On a wall I noticed a little insect fluttering in a spider's web; going to the rescue I found it was a nice little specimen of *Nudaria mundana* which I boxed, and thus deprived Mr. Spider of a dainty meal. Insects were scarce this evening, all I took was a single *Noctua brunnea*. My brother caught a fine specimen of *Cucullia umbratica* as it hovered over a flower in the garden.

Saturday was showery all day. In the evening I caught a very good *Geometra papilionaria* as it came slowly flying out of a wood.

On Monday, 22nd July I left Loch Ridon and many friends behind me, with much regret, but with the hope that I may return some other year to further investigate the insects of this beautiful countryside.

A. ADIE DALGLISH.

ENTOMOLOGICAL SOCIETY OF LONDON.

November 6, 1889,—Prof. J. O. WESTWOOD, M.A., F.L.S., Hon. Life President in the chair.

Mr. Richard S. Standen, of Framlingham Earl Hall, Norwich, was elected a Fellow; and the Rev. C. F. Thornehill, M.A., was admitted into the Society.

Mr. J. W. Douglas sent for exhibition specimens of *Anthocoris visci*, Dougl., a new species taken from the mistletoe, at Hereford, in the end of September last by Dr. T. A. Chapman; also specimens of *Psylla visci*, Curtis, taken by Dr. Chapman from the mistletoe at the same time and place.

Mr. R. M'Lachlan exhibited coloured drawings of a specimen of *Zygæna filipendulæ*, in which the left posterior leg is replaced by a fully-developed wing, similar to an ordinary hind wing, and with the neurulation almost precisely the same, but less densely clothed with scales. The specimen was described by Mr. N. M. Richardson in the Ent. Mo. Mag. for June, 1889, and the drawing was executed by Mrs. Richardson. Mr. M'Lachlan also exhibited a female specimen of the common earwig *Forficula auricularia*, with a parasitic *Gordius* emerging from between the metathorax and abdomen. He said that it had been placed in his hands by Mr. A. Farn, by whom it was taken, and that other instances of similar parasitism by *Gordius* on earwigs had been recorded.

Mr. W. F. Kirby exhibited a gynandromorphous specimen of *Lycæna icarus*, having the characters of a male in the right wings and the characters of a female in the left wings, caught by Mr. T. Brown at Keyingham, Yorkshire, on the 22nd of June last; also a specimen of a variety of *Crabro interruptus*, De Geer, found by Mr. F. Woodbridge in a hole in a log at Uxbridge.

Mr. W. L. Distant exhibited a male and female specimen of a species belonging to a new genus of *Discocephalina*, from Guatemala, in which the sexes were totally dissimilar, the female having abbreviated membranes, and being altogether larger than the male.

Dr. D. Sharp stated that he observed that in the *Ipsina* division of *Nitidulidæ* there was present a stridulating organ in a position in which he had not noticed it in any other Coleoptera—viz., on the summit of the back of the head. He had found it to exist not only in the species of *Ips* and *Cryptarcha*, but also in other genera of the subfamily; on the other hand, he could not find any trace of its existence, except in members of the *Ipsina*. He exhibited specimens of *Ips* and *Cryptarcha*, mounted to show the organ. Dr. Sharp also exhibited a box of *Rhynchota*, chiefly *Pentatomidæ*, in

which the specimens were prepared so as to display the peculiarities of the terminal segment in the male sex.

Mr. R. Adkin exhibited, on behalf of Mr. H. Murray, of Carnforth, a fine series of *Polla xanthomista*, var. *nigrocincta*, from the Isle of Man, and *Cidaria reticulata* and *Emmelesia ceniata* from the Lake District.

Mr. W. White exhibited a living larva of *Zeuzera æculi*, and called attention to the chitinous scutum or thoracic segments with several rows of minute serrations, which evidently assist progression. He stated that the larva exudes from its mouth, when irritated, a colourless fluid, which he had tested with litmus-paper and found to be strongly alkaline. Prof. Westwood made some remarks on the subject.

Captain H. J. Elwes exhibited a number of insects of various orders, part of the collection formed by the late Otto Muller, of Darjeeling.

Mons. A. Wailly exhibited the cocoon of an unknown species of *Antheraea* from Assam; also a number of cocoons and imagos of *Anophe venata* from Acugua, near the Gold Coast, West Africa; specimens of *Lasiocampa otus*, a South European species, which was said to have been utilized by the Romans in the manufacture of silk; also a quantity of nests containing the eggs of *Epeira madagascariensis*, a silk-producing spider from Madagascar, locally known by the name of "Halabe." He also read extracts from letters received from the Rev. P. Camboué, of Jananarivo, Madagascar, on the subject of this silk-producing spider.

Mr. H. Goss read a communication received by him from Prof. S. H. Scudder, of Cambridge, Mass., U.S.A., on the subject of his recent discoveries of some thousands of fossil insects, chiefly Coleoptera, in Florissant, Western Colorado, and Wyoming. Prof. Westwood remarked on the extreme rarity of fossil Lepidoptera, and called attention to a recent paper by Mr. A. G. Butler, in the Proc. Zool. Soc., 1889, in which the author described a new genus of fossil moths belonging to the Geometrid family *Euschemidæ*, from a specimen obtained by Mr. A. Court Smith at Gurnet Bay, Isle of Wight.

Mr. F. P. Pascoe read a paper entitled "Additional Notes on the genus *Hilipus*," and exhibited a number of new species belonging to that genus.

The Rev. Dr. Walker read a paper entitled "Notes on the Entomology of Iceland." Mr. Roland Trfmen asked if any butterflies had been found in the island. Dr. Walker said that neither he nor Mr. P. B. Mason had seen any during their recent visit to Iceland, nor were any species given in Dr. Staudinger's list. In reply to a question by Mr. G. C. Champion, Mr. Mason said that during his recent visit to Iceland he had collected nearly a hundred species of insects, including about twenty Coleoptera. He added that several of the species he had taken had not been recorded either by Dr. Staudinger or Dr. Walker. Capt. Elwes enquired if Mr. A. J. Walker, with his great experience as a collector in all parts of the world, was aware of any land except Iceland, outside the Arctic Circle, from which no butterflies had been recorded. Mr. J. J. Walker replied that the only place in the world which he had visited, in which butterflies were entirely absent was Pitcairn Island.—H. Goss, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

October 17, 1889.—Mr. HUCKETT, Vice-President, in the chair. Mr. Battley exhibited a variety of *Oporabia dilutata* with the bands very clearly marked on a light grey ground; Mr. Boden, series each of *Nematois scabiosellus* and *Spilonota incarnatana*; Mr. Clark, twenty-four species of *Pterophori*, including *Buamidophorus rhododactylus*, *Oxyptilus teucris*, *microdactylus* and *lætus*. Coleoptera:—Mr. Burrows, a living specimen of *Carabus granulatus*. Mr. Heaster a box of *Staphylinidæ*. Mr. Lewcock an excellent series of *Nebria complanata* (received from Mr. Gillo, of Bath). Mr. Milton exhibited a number of *Coccinellidæ*, *Bembicidium quadra-guttatum*, a brilliant example of *Carabus nitens* (received from Mr. White), a very fine Mole Cricket (*Gryllotalpa vulgaris*) obtained from Mr. Warburg, a small scorpion and several species of Homoptera and Diptera.

A paper from Mr. R. Gillo, on "Self-preservation of Insects was read by Mr. Lewcock. The paper treated of two methods:—active, subject to control; passive and independent of control, such as protection afforded by colour and form. An interesting discussion was taken part in by most of the members then present, frequent reference being made to the assimilation of many Lepidopterous larvæ to their food plant, and likewise to the mimicry observed in Coleopterons and other species of insects. A cordial vote of thanks to the author terminated the proceedings.

November 7.—Mr. J. A. CLARK in the chair. Mr. F. G. Whittle was elected a member of the Society. Mr. Boden exhibited *Phoxopteryx upupana*, *Mixodia rhatzburghiana*, *Lobesia servillana*, and *Eufæcilia cervistrigana* and *subroseana*. Mr. Goldthwait, a series of *Boarmia repandata* bred from ova. He stated that the female from which the ova were obtained was a very dark-coloured insect, and he was rather surprised at the result, the exhibited specimens all being very light. Mr. Bellamy, a series *Himera pennaria*, Mr. Clark, fine-bred series of *Agriopis aprilina*. The same gentleman also exhibited a variety of Coleoptera, in a mouldy condition, and contained in a stoppered laurel jar. Some discussion arose as to the cause of the mould, Mr. Clark stating that the laurel had been obtained in fine weather and the bottle kept in a dry room. Mr. Lewcock, by request of Mr. W. E. Sharp, introduced a discussion on the "Abnormal Abundance of various Species of British Lepidoptera in certain Seasons," and referred to *C. edusa* in 1859 and 1877. *D. Galii*, *A. atropos*, &c.

Messrs. Hockett, Clark, and other members related their experience with regard to these insects, Mr. Hockett stating that he had captured *C. edusa* on Hackney marshes, while the wings were yet in a limp condition, and he concluded from this circumstance that the insect had bred in that locality.—G. A. Lewcock and H. Hanes, *Hon. Secretaries*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY ASSOCIATION.

October 24, 1889.—T. R. BILLUPS, Esq., F.E.S., President in the chair. Messrs. W. Mansbridge, V. Gerrard, C. H. Collings, H. C. Pickard-Cambridge, and J. T. Winkworth were elected full members, and Messrs. C. J. Wainwright and A. Ford as country members. Mr. Wellman exhibited a bred series of the second brood of

Acidalia marginepunctata. Mr. R. Adkin, specimens of *Retinea resinella*, with pupæ and cocoons, and read notes on the life history of the species. Mr. W. West, *Gordius aquaticus*, and contributed notes. Other exhibits were made by Messrs. Tugwell, J. J. Weir, Ince, Adye, Moore, Fremlin, Auld, Mera, Manger, and by Mr. Billopson behalf of the Rev. W. F. Johnson and Mr. G. G. Grapes.

The Annual Exhibition was held at the Bridge House, London Bridge. S.E., on Wednesday and Thursday, the 30th and 31st October. Besides the class Insecta, the exhibits comprised Birds, Birds' Eggs and Nests, Fish, Reptiles, Mollusca and Crustacea; Geological and Botanical Specimens, Paintings, Engravings, &c., of Natural History subjects. There was a good display of Microscopic Objects and Apparatus, no less than thirty exhibitors shewing in the room set apart for them.

Among the principal exhibitors of Insecta were Mr. H. Burns with nests of living British Ants taken, among other localities, from Lambeth and Conway Castle, the species being *Formica fusca*, *Lasius flavus* (with queen), and *L. niger*. There was also a nest from Boulogne. Mr. R. McLachlan with European Neuroptera; *Ascalaphus*, *Nemoptera*, and *Perlida*; also a specimen of Orthoptera, from Burmah, *Megalodon ensifer*, Brullé. Mr. Eland Shaw also exhibited Orthoptera, Hymenoptera. Hemiptera and Diptera were shewn by Messrs. T. R. Billups, S. Robinson, and Miss M. Kimber; the latter an interesting case of *Sirex gigas* and *S. juvenicus*, with lead piping, shewing the ravages of the larvæ of these species. Mr. T. R. Billups put in his fine collection of Coleoptera. Messrs. Goodman, W. West, and Rev. W. F. Johnson also exhibited in this order, the latter with rare and local Irish forms. The chief exhibitors among the Lepidoptera were Mr. J. H. Leech with the whole of the Palæarctic *Catocalidæ*, one of the most attractive features of the Exhibition. Mr. Murray, series of *Polia xanthomista*, *Cidaria reticulata*, and dark forms of *Emmelesia teniata*, bred during the year. Mr. Austin, varieties of *Argynnis aglaia*, and *Lycæna icarus*; also series of *Angerona prunaria* and *Gnophos obscuraria*, both shewing a wide range of variation. Mr. A. C. Vine, specimens of *Deilephila livornica* and *Charocampa celerio*, *Coccyx scoparia*, *Lita leucomenanella*, *Nepticula fulgens*, and an undetermined *Gelechia* bred from *Genista tinctoria*. Mr. R. Adkin Rhopalocera from his collection, together with long and variable series of *Pieris napi*, *Lycæna icarus*, *Epunda lutulenta*, and many other species taken in the N. of Ireland and N. Wales; also a long series of *Acidalia marginepunctata*, from Sussex shewing great variation. Mr. J. R. Willman four drawers from his collection, including Sesiidæ, and fine and variable series of the *Acidalia* and *Eupithecia*. Mr. J. A. Clark a series of cases illustrating the life history of *Cossus ligniperda*, with sections of various trees, shewing the destructive powers of the larva. Mr. J. Elisha, the whole of his collection of the British Tineæ. Mr. G. J. Grapes, larvæ of *Hepialus virescens*, from New Zealand, attacked by fungi. Mr. Machin, Bombyces, amongst which were a fine variety of *Bombyx trifolii*, and a series of *Lasiocampa ilicifolia*, full series of the *Drepanulidæ* and *Dicranura bicuspis*, and black specimens of *Stauropus fagi*. Mr. Schooling, yellow specimens of *Zygæna filipendulæ*, and varieties of *Triphæna fimbria*. Mr. R. South, British Tortrices comprising amongst others long and variable series of *Leptogramma literana*, *Peronea cristana*, *P. hastana*, and *Teras contaminana*. Mr. C. B. Smith, *Eugenia autumnaria*, taken this year. Mr. Vaughan, fine varieties of Rhopalocera and of *Arctia caja*. Mr. Tutt, series of all the British species of the genus

Xanthia, arranged to shew the extreme and intermediate forms of variation; also a very complete collection of the British Pterophori giving locality and dates of capture. Mr. Barren, *Argynnis paphia* and var. *valezina*, with intermediate forms. Mr. Adye, several of the rarer Sphinges. Mr. West, of Greenwich, two drawers of British Tortrices containing the *Tortricidæ* and *Penthinidæ*. Mr. Tugwell, striking varieties of the Geometridæ; bred specimens of *Boletobia fuliginaria* with cocoon, from Bankside, Rotherhithe; long series of *Deilephila galii*, and varieties of *Arctia mendica*, *A. mentharastri*, and *A. lubriipeda*, from English, Scotch, and Irish localities, by Mr. C. A. Briggs. Mr. A. J. Croker, life histories of British species and varieties of Lycænæ. Mr. Albuary, varieties of many species. Exotic Lepidoptera were shewn by Mr. Jenner Weir. Mr. W. Dannatt *Ornithoptera* from the E. Indies and the Malay Islands, &c. Mr. S. Edwards, *Papilionidæ* from India, N. and S. America, &c. Mr. A. H. Jones, European *Papilionidæ*, *Pieridæ*, and *Apaturidæ*. Mrs. Hutchinson, Miss Adkin, Miss Billups, and Messrs. H. A. Auld, O. C. Goldthwaite, T. W. Hall, J. Jäger, E. C. Joy, C. Levett, B. L. Nussey, C. Oldham, C. H. Williams, G. B. Ashmead, H. T. Dobson, and many others assisted by exhibiting.

During the evening Mr. G. Day delivered two short lectures which were illustrated by the triplexicon lantern, and there was a table set apart for the display of Fungi by the Exhibition Committee assisted by Mr. W. Step.

At the close of the Tenth Volume of the Young Naturalist the Editor desires to thank his increasing circle of subscribers and contributors for the assistance they have afforded, and which have enabled him from time to time to make what are acknowledged to be improvements in the Magazine. A change of printer encourages him to promise greater punctuality in issue, and fewer errors than heretofore. The next volume will be printed from entirely new type, and will be illustrated to a considerably greater extent than hitherto. With the part for January will be given a photographic portrait of the veteran entomologist C. S. Gregson, Esq., of Liverpool. This is presented by Mr. Gregson himself to the subscribers of the Young Naturalist, and he has also taken the trouble to sign each with his own signature. With the February part will be given a full page plate drawn and engraved by C. H. H. Walker, Esq., of Liverpool, of an ichneumon new to science, with a description by G. C. Bignell, Esq., of Plymouth. The March part will contain a plate illustrating the burrows of trap-door spiders on Dartford Heath, drawn and engraved by Rev. J. O. Pickard-Cambridge, of Carlisle.

For other announcements you are kindly referred to the circular forwarded herewith, and with best wishes for the coming year and season the Editor begs your cordial co-operation in the next volume.

feeding for a short time hibernate at the roots of the food-plants till the following spring, when they feed up quickly. Like the last species they are fond of basking in the full rays of the sun. It does not occur in Scotland or the Isle of Man, but is abundant at Killarney in Ireland. In England, it seems to be most plentiful in the more southerly counties, and is very rare in the midland, not occurring north of Staffordshire. It is rare near London, but abundant in some parts of Devonshire, Cornwall, and Sussex; it also occurs in Kent, Essex, Suffolk, Wiltshire, Buckinghamshire, Gloucestershire, and Staffordshire. It is spread generally over Europe, but only occurs in the northern and western parts of Asia.

It was first figured and recorded as a British species by James Petiver in his "Papiliorum Britannicæ Icones," published in 1717, under the name of the Straw May Fritillary, and as being very common in Cain Wood.

Wilkes, in his "English Moths and Butterflies," 1773, writes, "The Heath Fritillary Butterfly. I found the caterpillars of this fly feeding on common heath in Tuttonham Wood, about the middle of May, 1745. Six or seven of them were feeding near to each other, I observed their manner of eating, which was extremely quick, and when they moved it was at a great rate. I fed them with common heath for three or four days; at the end of which some of them changed into chrysalis, in which state they remained about fourteen days, and then the flies came forth. This butterfly is very common in most woods, but its caterpillar is very rarely found."

Lewin, in his "Insects of Great Britain," 1795, writes, "It may be taken in June, flying in the open parts of woods and dry places, near which heath grows. In some summers it is tolerably plentiful, and in others scarcely to be met with; just as the winter has proved more or less favourable to the caterpillars."

Curtis, in his "British Entomology," 1832, writes, "*M. athalia* is found on heaths, marshes, &c., the end of May; in Coombe Wood; Hartley Wood, Essex; Apsley Wood, Bedfordshire; Dartmoor, and near Bideford, and in Bradley Wood, Devon, by Capt. Blomer, as late as the 10th of July. It used to be frequent in Cain Wood, and at Faversham. The *P. tessellata* of Petiver was formerly pretty common in Cain Wood, the beginning of May, where *M. athalia* was common also; I suspect it is only a variety of that species."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes, "The late Capt. Blomer used to take this very interesting insect plentifully in Devonshire; Ford Wood is one of the localities there for it, and Dartmoor another; it is taken also in Cain Wood, Middlesex; Bagley Wood, Berkshire, near Oxford; Apsley Wood, and near Bedford; near Deal,

Faversham, Canterbury, and at Coombe Wood, Kent. It occurs near Falmouth, but rarely; W. P. Cocke, Esq., has taken it there; also not very uncommonly near great Bedwyn and Sarum, Wiltshire, as J. W. Lukis, Esq., informs me; and at Langham Lodge Wood, plentifully; as also in Hartley Wood and Malden Wood, near St. Osyth, and in the High Woods, near Colchester, Essex, it has also been taken at Peckham, Surrey, near London."

Stainton, in his "Manual of British Butterflies and Moths," 1857, writes, "Mr. Tress Beale gives the following account of the habits of *Athalia* in the neighbourhood of Tenterden: chief locality, Knock Wood. They are generally congregated in one particular spot—an open heathy place, where the undergrowth is of about one or two years growth. The metropolis is mostly changed each year; for instance, I could point out four different places which have been occupied during the last four years. Stragglers are of course to be met with in other parts of the wood. They are fond of basking in the sun on thistles. When in the net they generally feign death, close the wings and contract the legs."

MELITÆA AURINIA.

Marsh Fritillary.

AURINIA, Rott. Aurin'ia, a Prophetess held in great veneration by the Germans. Tacit, Germ.

The name *Aurinia* was bestowed upon this butterfly by Von Rottenburgh, in 1775; and *Artemis*, the Greek name for *Diana*, by the author of the Vienna Catalogue, in 1776.

The wings on the upperside are of a reddish fulvous, tessellated with pale fulvous and black, the hind-wings having a broad reddish band near the hind-margin. On the underside the fore-wings have an appearance of the markings having been smudged together, and a shining surface, as if it had been greased: whence it is sometimes called the "Greasy Fritillary." The hind-wings are similar to those of the last two species; yellowish, banded with brownish orange, the outer band of which bears a series of black spots, each surrounded by a pale yellowish ring. The front edge of the front-wings is slightly concave in its outline about the middle, whereas it is convex in both *Cinxia* and *Athalia*. The width across the wings varies from an inch and a quarter to three inches.

The Marsh Fritillary varies more generally than any other British butterfly, and though its range of varieties is restricted by the three colours of the type, it is surprising what changes of appearance are produced. The Irish specimens, *Hibernica* of Birchall, are the most beautiful, the colours con-

trasting more, the paler shade being paler than the type, the red bands and spots being brighter red, and the black deeper. I have a small specimen from Carlisle similar to the Irish. The Scotch form, *Scotica*, of Buchanan White, is smaller and scarcely so densely scaled, the red and yellow not so distinctly different, and the black duller in hue. Both this and the Irish form often have the inner half of the red band near the hind-margin of a pale straw colour. In the north of England the insect is like the Scotch form, but as we approach the south the specimens are usually larger, the red and yellow markings still nearer each other in shade, and the black marks and veins are browner. Specimens occur not unfrequently with little or no black on the underside, while Dr. Gill had one with the upperside quite obscured with smoky black.

Two somewhat similar examples are figured in Loudon's "Magazine of Natural History," Vol. VI., p. 378. The first differs from the type by the absence of the red band, which is replaced on the lower wings by a row of black dots in straw coloured rings: there is also a reddish patch running from the middle to the inner-margin of each. This curious specimen was taken by J. C. Dale at Enborne, in Berkshire, on June 16th, 1810. The ocelli on the under-wings give it somewhat the appearance of *Cinxia*. The second was found at Haverfordwest by Capt. Blomer. In this specimen, the upperside is much obscured with smoky black, thus rendering the reddish band very conspicuous. Both of these varieties are females. In another I have, there is a large smoky black patch at the base of the lower-wings.

Stephens, in his "Illustrations," gives the following varieties.

Var. *b*. With the base and posterior margin of all the wings tessellated with fulvous and whitish.

Var. *c*. With the wings similar to the last at the base: the anterior with three oblong fulvous spots near the costa towards the middle; then a fulvous fascia composed of very narrow elongated longitudinal stripes: a waved band composed of quadrate fulvous spots; and a black marginal band bearing lunulated fulvous spots beneath, similar to the first described.

Var. *d*. Posterior wings beneath, with the irregular basal band totally obliterated: the central band not edged with black externally.

Var. *e*. The posterior wings beneath with the basal half fulvous, the exterior half ochraceous, with an obsolete row of black spots.

The variety *Provincialis*, Boisd., occurs in the south of France, &c., and is a large insect with scarcely any perceptible difference between the red and yellow bands, the divisions between them and the wing rays being brownish black. The French type differs considerably from the south of England form,

but these differences, though clear to the eye, are difficult to describe in words.

Merope, Prun. is an Alpine form and approaches the Scotch or North of England specimens, but it is much less densely scaled and has a semi-transparent look, sometimes it is all black and straw colour, except the outer red band on the hind-margins.

The variety *Sibirica*, Staud., occurring in Siberia, differs from most northern specimens, for it is paler than any other, while northern forms are generally dark. *Sibirica* is the same as *Desfontainesii*, Evers. The Spanish and African form is called *Desfontainesii*, Godt., and is the same as *Desfontainesii*, Boisd. and Herrich-Schaffer. It is more uniformly fulvous than any other. The Turkish specimens are paler on the under, and more varied on the upperside, and are called *Orientalis*, H-S.

An allied species *Cynthia*, Hub., bearing a close resemblance to the var. *Hibernica*, Bir., occurs on the higher Alps.

The egg is of an ovate shape, truncated at the top, and slightly flattened at the bottom, and is ribbed from the top for about half the length, the rest of it being smooth: it is of a shining pale brown colour. The eggs are laid in clusters of a hundred or so, on the face of a leaf.

The caterpillar is of a velvety black with black spines, short and blunt tipped, with short, radiating, black, and pointed hairs, and with numerous white dots, in three not very clearly defined rows. The spines are branched, and most numerous from the fifth segment. The head and legs are black, the claspers smoke coloured. It feeds on the Devil's-bit Scabious (*Scabiosa succisa*), and also on plantain.

The chrysalis is short and stumpy, and of a pale stone colour, spotted with black, turning brighter as the time of emergence approaches, when the red and black markings may be seen through the skin.

The butterfly is on the wing from the middle of May till the latter end of June, or sometimes even later in the more northern localities. The caterpillars are gregarious when first hatched, and draw the leaves down together, while they live under shelter of the tent thus formed, and devour the underside of the leaves only. They feed but slowly during summer, and pass the winter low down among the leaves of the food-plant, or other herbage, which are drawn together as described. On the approach of warmer weather they leave their hybernaculum, and feed quite exposed, being apparently as fond of the rays of the sun as the rest of the genus. When full-fed they seek the underside of a leaf, or similar shelter for their final change, which takes place in the latter end of April, or the beginning of May.

Two species of parasitic Hymenoptera have been bred from it, *Apanteles Bignellii*, Marsh., and *spurius*, Wesmael.

Newman, in his "British Butterflies," states, that nine out of ten of his caterpillars were infested with a species of *Microgaster*, varying from ten to twenty-six in each caterpillar. They emerged in similar manner to the well-known parasite of *Pieris brassicae*, spinning small silken cocoons outside. Probably they belonged to one or the other of the above mentioned species.

The Marsh Fritillary frequents damp meadows, or similar places. Where it occurs it is often exceedingly local, frequenting perhaps one corner only of a field, and after changing its head-quarters, quite disappearing from the place where it abounded one year, and being as abundant the next year in another spot not far away. It occurs in every English country and in several parts of Ireland and Scotland below the Caledonian Canal. It is generally distributed over Northern Europe and Siberia, but does not occur in the polar regions. It scarcely reaches the countries bordering on the Mediterranean, though one variety occurs in Turkey, and another in Spain (Andalusia) and in Barbary in Africa. It is first described as a British species in Ray's "Historia Insectorum," published in 1710.

Petiver, in his "Papilionum Britannicæ Icones," 1717, calls it "Dandridge's midling Black Fritillary," and that Mr. Dandridge observed it in Cain Wood and the Oak of Honour Woods near Dullidge, about the end of May and beginning of June.

Wilkes, in his "English Moths and Butterflies," 1773, writes, "About the 10th of April, 1741, I took upon the ground upwards of one hundred of these caterpillars, in Cain Wood. I gave them to eat a variety of growths which I gathered on the spot where I found the caterpillars, but they were so restless and uneasy under confinement, that they seemed in continual motion, neither would they eat any of the food I give them. On the 18th of April, ten of the caterpillars fastened themselves up by the tail, in order to change into chrysalides (the rest being gone away or dead), and on the 3rd of May following the flies were bred. This butterfly is to be taken in woods and grass fields adjacent to woods, in the month of May."

Moses Harris, in his "Aurelian," 1766, writes, "They are generally found on the side of a hill that rises with an easy ascent, and fronts the east, by which they have the sun most powerful in the morning, and avoid the too scorching heat in the afternoon. It was said that they fed on plantain and grass, but I found that to be a mistake, having often endeavoured to feed them with both, but my endeavours were always fruitless, and accordingly on the 18th of April, 1760, I went to Neesdon, Wildsden, about seven miles from London, where I was informed they were in great plenty, as indeed I found them to be. Here I took great pains to watch their actions for full two hours. I paid them several visits a few days afterwards, that I might be

able to give a satisfactory account of them. Their food is the Devil's-Bit Scabious, which, at that time of the year, hardly appears above ground. They feed on the opening leaves as fast as they come up, which is the reason why those who found the caterpillars could never see the food. When the sun happens to be shut in by clouds they stand still, and though eating very greedily, they will suddenly cease: but on the return of the sunbeams, they run nimbly over the tops of the grass, and descend into every vacancy in the grass they can find in search of this food. Nor did I ever find above two at one root, although the field appeared to be covered with the caterpillars. When in their last skin they appear to be very black, and thickly set with sharp spikes; and their back and sides are powdered with white specks. The preparation they make for the preservation of their chryslides is much to be admired. When one is ready for his transformation, his first business is to draw several pieces of blades of grass across each other toward the top. These he fastens together with his web, and then beneath the centre, where the blades of grass intersect each other, he hangs himself pendulous by the tail, and changes to the chrysalis. This method they have of providing for their safety while in the chrysalis state, is a strong proof of the amazing instinct of these little creatures. They are not only securely hid from the sight of birds, but defended from the damage they might otherwise sustain in boisterous and windy weather; for, as the grass is drawn from every side, let the wind blow which way it will, one or more of the pieces of the grass immediately acts in the manner of a stay. It is remarkable in this insect that neither fly nor caterpillar will stray from the field in which they were bred, and though I have seen some thousands in the field, yet I could never find one in the meadows adjoining. In September the caterpillars may be seen in great abundance. They keep together under the cover of a fine web, which they spin to defend themselves from the inclemency of the weather, and under the protection of this they pass the winter months."

Stephens's, in his "Illustrations of British Entomology," 1828, writes "A local species, rare near London, but particularly abundant near Brighton, and at Enborne, in Berkshire; it also occurs near Norwich; in Clapham Park, Bedfordshire; in Dorsetshire; in Glamorganshire; at Eriswell and Mildenhall, in Suffolk; Dartmoor, in Devonshire; and at Beachamwell, in Norfolk; usually towards the end of May."

Newman, in his "British Butterflies," 1871, writes, "In Ireland it is common, occurring in the county Wicklow, also in Galway and at Killarney; and is abundant at Glen Lough and Cromlyn Bog, in Westmeath, where it is very highly coloured and very various in size. In Scotland it seems rare and local, but increases as far north as Forres. Scottish specimens are

slightly smaller and darker than English ones. In Cumberland it is abundant at the Brick House, Saburgham. The caterpillars from this bleak place produce very small dark specimens, and also some beautiful varieties with large canary-coloured spots on the fore-wings."

This brings to a close the second division of the Butterflies, viz. "Pendulæ," so called because the chrysalides are attached by the tail only, and swing in the air, with the head pointed towards the ground.

The third and last division is called "Involutæ," from the circumstance of the caterpillars concealing themselves in a silken follicle or cocoon before changing into chrysalides. These cocoons are generally hidden in rolled-up leaves, or at the roots of grass; some of them are even attached to grass stems. The simple structure of the chrysalis, and the habit of the caterpillar of rolling up leaves are peculiarities at variance with the general characters of the Diurni, and agreeing with the Heterocera.

Family HESPERIDÆ.

This is a family of butterflies generally of small size and obscure colours, and very numerous in species, probably more than fifteen hundred are known, and of this number at least half are natives of tropical America. Many fine species occur in India, and but few in Australia, Africa, and Europe. In the last named quarter of the globe there are scarcely more than thirty species. Their flight is extremely rapid, the eye being hardly able to follow their movements. They delight in the hottest sunshine; and their small powerful wings, enable them together with their robust bodies to rival the hawk moths in swiftness. Their peculiar flitting movements have caused them to be named "Skippers" by our English collectors. Many of the species possess a pair of spines in the middle of the hind tibiæ, which are not found in any other butterflies. In some species, *Nisioinades tages*, *Tamycus zealeucus*, &c., all the wings lie in a deflexed position when the insect is at rest; but in most of the species the hind-wings are deflexed, whilst the fore-ones are more or less perpendicular. It is on this account that Dr. Agassiz regarded the Hesperidæ as a lower type than the majority of butterflies (which on account of their resting with their wings in a position opposed to that which they occupied in the chrysalis state, are considered not only as higher than the rest of the Lepidoptera, but also than all other insects.) The veins of the wings offer several remarkable particulars: thus, the four branches of the postcostal vein of the fore-wings arise at nearly equal distances apart, before the anterior extremity of the discoidal cell, closely followed by the two dis-

coidal veins and the branches of the median vein; the whole forming a series radiating from the discoidal cell in so regular a manner, that Dr. Herrich-Schäffer regards this group as the type of the Diurnal Lepidoptera on this account. The more or less obsolete character of the discoidal vein of the hind-wings, and the arrangement of the basal portion of the veins are further peculiarities of the family. The peculiar distinction indicative of the sexes, afforded by the structure of the fore-legs in many of the preceding genera, is here wanting; and it is consequently difficult, except in those species where the wings afford sexual distinctions, to determine the sexes of different individuals. In some, *Tages*, &c., the fore-margin of the fore-wings is recurved in the males, the enclosed space being thickly clothed with pale coloured down. In others, *Linea*, *Comma*, *Sylvanus*, &c., there is a thickened and oblique ridge on the middle of the fore-wings. Hubner divided the family into forty-two genera or sub-genera. In Britain we have four, viz.: *Cyclopides*, *Hesperia*, *Syrichthus*, and *Nisoniades*.

GENUS XXI.—CYCLOPIDES.

Hubner.

CYCLOPIDES, the sons of Neptune who assisted Vulcan in forging Jupiter's thunderbolts. The genus was also named *Carterocephalis* by Lederer, and *Steropes* by Boisduval. The species of this genus or sub-genus differ from those of the next in the differently formed club of the antennæ, by having a more slender body, and especially by the want of an oblique black patch across the middle of the wings of the male, and the identity of colouring in the sexes. A more important character, however, consists in the posterior tibiæ possessing only a pair of spurs at the tip. There are only a small number of species known, four of them occurring in Europe.

PANISCUS.

Chequered Skipper.

PANISCUS, Fab. Panis'cus, diminutive of Pan, the God of Shepherds; also named *Palæmon* by Pallas, which latter name is sometimes adopted.

This pretty species is generally about an inch and a quarter in the expansion of its wings, which on the upperside are of a rich dark brown colour, chequered with orange tawny spots. The underside is similar but paler. The spots differ in size in different specimens, but otherwise it does not appear to vary, nor is there any material difference between the sexes. The antennæ are of a bright fulvous yellow beneath, and annulated with black and

yellow above. The width across the wings is from an inch and one line to an inch and two lines.

The egg is of a hemispherical shape, with flat base, and is of a white and shining colour, resembling porcelain.

The caterpillar when newly hatched has a largish and uniformly cylindrical body, which is velvety white; the head is black and shining, and there is a shining black linear plate on the second segment. After feeding a couple of days, the colour of the body changes from white to a very faint tint of bluish green. When full-fed, the ground colour is a pale orange white, with a pale reddish brown dorsal line, and a yellowish sub-dorsal line.

The chrysalis is long, slender, and nearly cylindrical, with the head blunt and the eyes rather prominent and a sharp spike between them. The anal end is rounded, with a flat spike set at the tip, with a dozen or more curled spines of different lengths. The colour on the back is a creamy white, with a very dark brown central line, a sub-dorsal of pale buff bordered with reddish brown; the wing-cases are of a pale flesh colour faintly tinged with dark brown. (Rev. J. Hellins, in "Buckler's Larvæ.")

The butterfly is on the wing in May and June. The caterpillars are hatched in June, and feed on the wood brome grass (*Brachypodium sylvaticum*.) They draw the tips of the leaves together, so as to form little cylindrical retreats, which they make secure by spinings of silk. When they out-grow the tubes they make fresh ones. Mr. Buckler writes, "On the 10th of October, one had spun itself up by drawing a leaf round itself as it lay on the underside. The leaf not being broad enough, the two edges did not quite meet, and the interstice had been well covered with whitish silk, forming a complete cylindrical silk-lined hybernaculum; other caterpillars seemed ready to follow this example. They leave their hybernaculum in March, feed up quickly and then turn into chrysalides."

Cyclopides paniscus is common over a good part of Central Europe, and in Russia extending to Finland and Siberia. In the North-west of Europe, it is a very local species, and is met with in open places in woods. It does not occur at all in either Scotland or Ireland, and only in a few midland and southern counties of England. It appears to occur most plentifully in the counties of Huntingdonshire, Northamptonshire, and Nottinghamshire, and more rarely in Suffolk, Oxfordshire, Lincolnshire, Hampshire, and Dorsetshire (one specimen.)

The first account we have of it as being a British species is in the "Transactions of the Linnean Society," Vol. V., Nov. 6th, 1798, "The Rev. Mr. Abbot, F.L.S., informed the Society of his having taken the *Papilio paniscus* in Clapham Park Wood, Bedfordshire." He observes "that this

Papilio is most easily taken in May and June, when the *P. lucina*, or Duke of Burgundy Fritillary, is out; but the term of its existence seems to be longer, as some specimens have been caught, in good condition, a full fortnight after the *Lucina* has disappeared. It is to be found from 7 to 9 o'clock in the morning; very often playing in pairs just after sunrise, or at least as soon as the morning fog has evaporated. Its flight is extremely short, very near the ground. It delights to settle on the blades of very long grasses or Carices, and is far from being a timid insect. "Mr. Abbott wishes to name it the Duke of York Fritillary. With its caterpillar and chrysalis he is unacquainted."

The first specimens were taken by Dr. Abbott on May 8th, 1798.

Haworth, in his "Lepidoptera Britannica," 1803, writes, "Habitat imago sylvaticis May: rarissima, sed prope Bedfordium frequentius capta et ad me missa amico meo C. Abbott, D.D."

In the end of June, 1802, Dr. Abbott took faded specimens in White Wood, Gamlingay, Cambridgeshire. It was next taken in great plenty in the Hanglands, Milton, near Peterboro, on May 1st, 1823, by Mr. Henderson, Lord Milton's gardener; and in the same place on June 6th, 1826, by J. C. Dale.

Stephens, in his "Illustrations of British Entomology," 1828, writes, "Generally reputed a scarce, but merely a very local species; it occurs in great plenty in several parts of Northamptonshire and Bedfordshire at the end of May. Between Woodstock and Enstone, Oxon—Rev. W. T. Bree. Near Dartmoor, Devon—Miss Jermyn."

In the "Entomologist" for 1841, Mr. Doubleday records it as being in profusion in Monk's Wood and in a wood near Oundle, Northamptonshire.

In the "Entomologist's Weekly Intelligencer," for 1857, Mr. Harvey writes, "I have great pleasure in announcing that this year I have taken this rare insect at Netley Abbey, near Southampton: and Mr. Sturgess writes, "I have much pleasure in stating that this very local insect has been taken very freely in the neighbourhood of Kettering during the past month."

In the "Entomologist," Vol. XV., for 1882, the Rev. W. Fowler writes, "In a wood about seven or eight miles from Lincoln, while hunting for Coleoptera on June 2nd, I saw *Hesperia Paniscus*, evidently not uncommon in one locality. On two subsequent occasions I visited the wood, but each time a thunder storm, followed by heavy rain, came on just as we reached it, and stopped our operations; we, however, took one specimen each time, showing that it was still out, and I have no doubt that the insect was fairly plentiful."

GENUS XXII.—HESPERIA.

Latreille.

Hes'peria, an ancient name for Italy.

The short thick club of the antennæ, terminated by a short slender recurved hook, and the minute size of the last joint of the labial palpi, are the chief characteristics of this genus, in addition to the velvety oblique streak in the wings of the males of many of the species. The general colour of the wings is either tawny orange marked with brown, or brown strongly marked with orange; the colour being generally so disposed as to leave a row of spots near the apical margin of the fore-wings; the colours of the female, moreover, are brighter than those of the males.

Over three hundred species have been described; of which four only are found in the British Isles.

HESPERIA COMMA:

The Silver-spotted Skipper.

COMMA, Linn. Com'ma, thus named on account of the mark of the fore-wings.

The wings on the upperside are of a rich brown, blotched and spotted with fulvous; the spots towards the tips of the fore-wings being of a whitish fulvous: on the underside greenish, with square white spots.

The width across the wings varies from an inch and two lines to an inch and four lines. There is a black streak on the fore-wings of the male.

Like all the Skippers it is remarkably constant to the type. One form is named *Catena*, Stgr., having the hind-wings greenish. It occurs in Lapland. Two fine varieties are figured in Mosley's "Illustrations." One from the collection of the late Mr. Alfred Owen, has the usual pale spots nearly white. The other which was taken at Newmarket, and is in the rich collection of Mr. Bond, has the spots and markings of the usual hue, but the other portions of the wing, which are generally darker, are all of a pale greenish drab.

The egg is dome shaped, with a small circular depression on the summit, the surface being apparently smooth. When freshly laid it is of a creamy white colour, but afterwards becomes darker with the faintest possible tinge of bluish green. In size it is about $\frac{1}{20}$ of an inch wide, with rather a flattened top, about $\frac{1}{10}$ of an inch across, and is $\frac{1}{30}$ of an inch in height. (Rev. J. Hellins.)

The caterpillar is of a dull green mixed with red ; second segment white ; head black ; there are also two white spots near the bottom of the tenth and eleventh segments. It feeds on the bird's foot trefoil (*Lotus corniculatus*) and other papilionaceous plants.

The chrysalis appears never to have been described.

The butterfly emerges in July and continues on the wing for more than a month. The caterpillars are hatched in April and turn into chrysalids in June.

Hesperia comma occurs throughout Europe and Northern and Western Asia, on heaths, downs, &c. It is unknown in Scotland, Ireland, or the Isle of Man, and is a very local species in England, occurring on chalk downs. It is common in the counties of Kent, Sussex, Surrey, and Cambridgeshire, and rare in those of Devonshire, Dorsetshire, Wiltshire, Gloucestershire, Buckinghamshire, Berkshire, Hertfordshire, Northamptonshire, and Yorkshire.

It appears to have been known in Britain as long ago as 1667, for Dr. Christopher Merrett, in his "Pinax rerum Naturalium Britannicæum," gives the following description of a butterfly: "Alis conchatis, et clavatis: ex albo et obscure rubente variis."

Moses Harris, in his "Aurelian's Pocket Companion," 1775, records the Pearl Skipper as being found in swampy ground on briars, Hanwell Heath, near Ealing, on August 25th.

Lewin, in his "Insects of Great Britain," 1795, writes, "This butterfly is said to be out on the wing in August, and to have been taken on the swampy ground on Hanwell Heath, near Ealing, in Middlesex. The specimens of this fly that I have seen lead me to think, that it is not a distinct species, but merely a variety of the Large Skipper."

Donovan, in his "Natural History of British Insects," Vol. IX., published in 1800, writes, "In the begining of August, 1772, a brood of these insects were taken near Lewes, in Sussex, by the late Mr. Green; and we believe no other specimens have been taken since that period. It is not very unlike the *Papilio sylvanus* of Fabricius, but may be readily distinguished from it by the square spots on the underside being perfectly white."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "A local species occurring in plenty on Riddlesdown, near Croydon, and on the chalky downs of Sussex, especially near Lewes. It used formerly to be taken on Hanwell Common, Middlesex, but I have not heard of recent captures near that place: it appears towards the end of August. Discovered in considerable abundance towards the middle of August, 1825, on the Devil's Ditch, between the running gap and the turnpike; the specimens remarkably

large and fine.—Rev. L. Jenyus, Old Sarum, Wilts., 1826.—J. C. Dale.”

The Rev. F. G. Morris, in his “History of British Butterflies,” 1853, writes, “This species is plentiful near Newmarket, and at Gogmagog Park, near Cambridge; Mr. Dale records the neighbourhood of Hull as another locality for it; Barnwell and Ashton Wild, and the neighbourhood of Polebrook, Northamptonshire; near Dover, Kent; Old Sarum, Wiltshire; Croydon, Surrey; Lewes and Brighton, Sussex, are also its habitats, and Blanford also.

HESPERIA SYLVANUS.

Large Skipper.

SYLVANUS, Fab. Sylva'nus, God of the winds, Virg. Georg.

The wings on the upperside are of a rich brown, blotched and spotted with fulvous: on the underside of a greenish brown, indistinctly spotted. The male has a black streak on the fore-wings. The width across the wings varies from an inch and two lines to an inch and four lines.

This butterfly varies a little in hue, and in the extent or clearness of the paler markings, but is still very constant to the type. A fine variety is figured in Mosley's “Illustrations.” It has the wings of an orange yellow, paler towards the hind-margin, which is dark brown; there is also a dark brown spot on the costa, near the tip.

The egg at first is of a dull white, being afterwards tinged with yellow, and is of a globular shape, with the base flattened: the shell is dull and finely granulated, and covered all over with extremely faint blunt hexagonal reticulation, with fine reticulation just on the top.

The caterpillar, when young, is of a pale yellowish colour, with black dots set with exceedingly short bristles, and a large smooth brilliant jet black head. At the end of three weeks or so, the colour changes to a dull green, and it spins together the edges of the grass blades, and makes an opaque web, not much bigger than itself for a hiding place. After hybernation in May, the colour is a pale green, the skin being thickly covered with very fine short dark brown bristles, the head of a dirty white, with dark brown stripe. It is of a cylindrical shape, and feeds on various grasses (*Holcus lanatus*, *Luzula pilosa*, &c.)

The chrysalis is of a chocolate brown colour, slender in shape, and is enclosed in a folded blade of grass. The butterfly appears on the wing in the end of May and June, and also in July and the beginning of August.

Hesperia sylvanus is found all over Europe, except the extreme north, and in Northern and Western Asia. It is widely distributed and common in

England, but scarcer in the north, and apparently unknown in Northumberland. In Scotland, it occurs only in the south, and is not common. It is also a scarce and local species in Ireland, but more common in the Isle of Man. It was first described and figured as British by James Petiver, in 1717, in his "*Papilionum Britanniae Icones, Nomina, etc.*," and recorded as occurring at Hampstead, under the name of the "Cloudy Hag."

Moses Harris, in his "*Aurelian*," 1778, writes, "The caterpillar of this fly has never yet been discovered in this country. The moths delight to fly in woods, and lanes near woods: their actions are somewhat remarkable, and not unworthy of notice, for whenever they settle, which is very frequent, as they are never long on the wing, they are sure to turn half-way round, so that if they settle with their heads from us, they turn till their heads are toward us, and sometimes till they have turned quite round. When on the wing, they have a kind of skipping motion, which is effected by reason of their closing their wings so often in their passage, and whenever they settle they also close their wings. They are found in the months of May and August, as there are two broods a year. The male is much the less."

Lewin, in his "*Insects of Great Britain*," 1795, writes, "This is a very common butterfly. There are two broods of them in the summer: the first makes its appearance the middle of May, and the second is on the wing in August. It frequents, woods, heaths, and lanes. Its flight is very short; but when on a bush or shrub, it is almost constantly in motion, skipping or leaping from leaf to leaf. From this habit, common to all the flies of this section, it derives the appellation of Skippers."

Donovan, in his "*Natural History of British Insects*," Vol. VIII., published in 1799, writes, "Fabricius has no reference to any author for a figure of this species, nor is it described by Linnæus; this is the more remarkable, as the species is found in great abundance in the months of May and June in this country, and is not uncommon by any means in Sweden and Germany."

An allied species *Vitellius*, Abbott and Smith, Lep., Georgia, 3 f. 17, is stated by Mr. Haworth, in the "*Entomological Transactions*," 1812, to have been caught in Bedfordshire by the Rev. Dr. Abbott, although he added that he possessed specimens of the same from Georgia, in America. Of the female two specimens were taken at Barnstaple, in Devonshire, by Mr. W. Raddon (or supposed to be), and communicated to Mr. Stephens, who published a figure of this presumed species in his "*Illustrations*," in 1828, and gave it the name of *Bucephalus*, or the Large-headed Skipper.

Mr. Stephens, after describing it goes on to say, "Taken in the neighbourhood of Barnstaple, in Devonshire, by W. Raddon, who possessed two specimens of the insect, which he assures me were captured by himself in the

above locality several years since. I have therefore on his testimony admitted the species; but I cannot help surmising that its origin is questionable, and that the specimens were probably imported in one of their earlier states, among the timber or other stores which Mr. Raddon acquaints me came direct from the North American continent to Barnstaple. I am induced to say this much from the circumstance of the section of the genus to which this insect belongs, being without any other exception exclusively found in America." A specimen was also stated to have been taken by Mr. Newman near Godalming, in Surrey. J. C. Dale had one of the above *Bucephalus* from Mr. Raddon, who had placed them as the females of *Sylvanus*, not having the true female, evidently a mistake. J. C. Dale had also Dr. Abbott's specimen of *H. vitellius*. It is possible that Dr. Abbott received it from the American Mr. Abbott, to whom he was supposed to have been related.

HESPERIA LINEA.

Small Skipper.

LINEA, W.V. L'inea, named such on account of the line on the fore-wings. It has also been described by Hufnagel under the name of *Thaumus*, but that name was applied by Fabricius to an American species from Philadelphia.

The wings on the upperside are of a rich fulvous shaded into brown at the borders. The male has an oblique blackish line near the centre of the fore-wings but they are not clouded with brown, as are those of *Actæon*. On the underside the wings are unspotted, the hind-wings being of a greenish tawny, the fore-wings of a dull tawny. The width across the wings is from one inch and a line to an inch and three lines. It is but rarely known to vary. A male of the pale or bone coloured form is figured in Mosley's "Illustrations," and Mr. Bond has the same form in both sexes, as have a few other collectors. In those specimens there is no change in the markings.

The egg is not at all like that of *H. Sylvanus*, but is considerably smaller, of a long oval figure, half as long again as wide, the shell glistening, devoid of ribs or reticulation; at first white, then turning dull yellowish, and at last paler again, with the dark head of the caterpillar showing through.—(Rev. J. Hellins.)

The caterpillar when young is of a pale dull yellow, and is slender, cylindrical, with a very smooth skin, and no bristles except on the second and thirteenth segments, and some very short ones on the head. When full-grown it is ten lines in length, and is of a tender and delicate grass green colour,

without any gloss, with a dorsal stripe of a darker and bluish green, having a stoutish line of paler green running through the middle, and bordered outside in stronger contrast by a stout line of green still paler than the ground: the head is of rather a deeper green than the body, and rough with minute points: there is also a transverse path of white on the front of the ventral surface of the eleventh and twelfth segments. It is cylindrical in shape, but tapers towards both extremities. It feeds on soft-haired grasses, *Holcus lanatus*, *Brachypodium sylvaticum*, &c., and spins little ropes of silk across the blades of grass, making little web coverings. When ready to turn into chrysalis it encloses itself within two or three leaves of the grass, joined together longitudinally by lacing or spinning with white silk.

The chrysalis is of the same light green as that of the caterpillar, of which the paler lines can still be faintly traced. It has a pointed head-case, and is very sharply tapered towards the tail, much resembling in form that of *H. actæon*.

The butterfly appears on the wing in July and the beginning of August; the egg is laid on the food-plant, and the caterpillar hibernates quite small, feeding up in the spring, and assuming the chrysalis state in June.

Hesperia linea is found all over Europe except the extreme north, and occurs also in Asia Minor, Persia, and North Africa. It is generally distributed in England, but most abundant in the south. It does not appear to frequent either Durham or Northumberland, nor has it been taken in Scotland or the Isle of Man, but Mr. Birchall has taken it in Ireland at Powers-court, and near Cork, and it probably frequents many other places in the Emerald Isle.

It was first described as a British species in Ray's "Historia Insectorum," 1710, and recorded as appearing in pastures in the beginning of July.

Petiver, in his "Papilionum Britannicæ Icones," 1717, calls the male the "Spotless Hag," and the female the "Streakt Golden Hag." In his "Gaz. Nat." he records it as being taken by Mr. Dandridge.

Moses Harris, in his "Aurelian," 1778, writes, "Small Skipper. The caterpillar of this fly is also undiscovered. The moth flies in woods, and its actions are also similar to the above; but there is only one brood a year and they appear about the middle of July."

Lewin, in his "Insects of Great Britain," 1795, writes, "This minute fly is met with on heath, common, and lanes, in most parts of England. It is first out on the wing the beginning of July, and may be readily taken; as it flies but little, and frequently settles, and skips from leaf to leaf on low bushes, rather than take wing when disturbed. The caterpillar of this species is likewise unknown."

DONOVAN, in his "Natural History of British Insects," 1798, writes, "A very generally diffused species, but not common; it is similar to the *Papilio sylvanus* of Linnæus, or *Hesperia sylvanus* of Fabricius, which is in the greatest abundance in the skirts of woods in summer."

STEPHENS, in his "Illustrations," 1828, writes, "Less common than the *P. sylvanus*, but nevertheless pretty abundant; it frequents the borders of woods and shrubby places, towards the end of July."

NEWMAN, in his "British Butterflies," 1871, writes, "In England it is generally abundant, more particularly in the southern and midland counties, but has mysteriously disappeared from many places where it was formerly common; in Essex, it occurs in open swampy places that are covered with rushes."

It is a very abundant species in Dorsetshire, both on the coast and inland.

HESPERIA ACTÆON

Lulworth Skipper.

ACTÆON, Esp. Actæ'on, a hunter, who seeing the goddess Diana bathing in a fountain, was changed by her into a stag, and then was pursued and devoured by his own hounds, who took him for a real stag.—Ovid. Met.

The wings on the upperside are of a dull rich brown, shot with fulvous, and with a narrow dark hind-margin. The male has a black line from the centre of the wing nearly to the base of the inner margin. The female has a curved row of rather pale fulvous spots. On the underside, a greenish tawny is the prevailing colour. The width across the wings is from an inch to an inch and two lines.

The only varieties, I have seen or heard of, are a couple of females without the spots, in my own collection.

The egg does not appear to have ever been described.

The caterpillar is of a cylindrical shape, but tapers somewhat towards both the head and tail. It is of a pale greyish green, with two yellowish longitudinal lines down the back, the space between them being rather darker than the ground colour, and a yellowish line at the sides. The ventral area is marked on the tenth and eleventh segments with a snow white patch, which appears to be a peculiarity of the whole genus. The colour of the head is brown in the young caterpillar, pinkish green in the old ones, with two lines down the face. The spiracles are of a pale flesh colour, and the legs are very short and of a green colour. It feeds on grasses, *Brachypodium sylvaticum*, *Triticum repens*, *Calamagrostis epigejos*, &c. The habit of feeding is as follows: ascending high up the blades of the grass, it eats out a

wedge-shape portion from the side, which cuts off the pointed top, leaving an oblique edge above, and proceeds to eat away large wedge-shaped pieces from the side of the blade; when tired of feeding it moves lower down the blade, and spins a coating of white silk from one side to the other, causing the two edges of the blade to draw together a little, and then in a silk lined hollow rests awhile, and then comes out again to feed. When full-grown it seeks for a retired shelter, which it finds between some leaves, of which it forms a spacious habitation by spinning, in the open parts, a thin wall of whitish silk web, with large and very irregular meshes; the resting place being thickly covered with whitish silk, but most thickly where the tail of the caterpillar is to rest. In four or five days it changes into a chrysalis.

The chrysalis is very slender, and is three-quarters of an inch in length, with two lines across the arched thorax, and has large prominent eyes; the top of the head is a trifle flattened, and has a beak-like process projecting forwards, of a flattened triangular shape; the tail ends in a prolonged and blunt flattened tip, furnished with a circlet of exceedingly minute recurved hooks. The wings, antennæ, and legs are plainly developed, and the proboscis is extended at full length down the body, from which it lies wholly free towards its extremity. It is of a very pale and delicate yellowish green colour, on which all the stripes of the caterpillar, though faint, are to be seen. Just before the emergence of the butterfly, the colour changes to a purplish black.

There are apparently two broods of the butterfly, the first appearing in June, the second in August, but specimens may be met with all through the summer. In 1833, the butterflies appeared as early as the 31st of May, and in 1888, worn examples were still on the wing as late as the 13th of September. The eggs are laid in June, July, and August. The caterpillars hatched from the earlier laid eggs feed up before winter comes on, and hibernate probably in the chrysalis state. Those from the later eggs hibernate small, and feed up in the spring. Being full-fed in the middle or end of June, they remain about a fortnight in the chrysalis state.

Hesperia actæon is a very local species, though abundant where it occurs; and is found in central and Southern Europe, Asia Minor and North Africa, also in the Mauritius and the Canary Islands. At Meseritz, in Austria, the caterpillars were found by Professor Zeller feeding in June, on the wood small reed grass (*Calamagrostis epigejos*), chiefly under the shade of fir trees. In Britain, it is exclusively confined to a very few restricted localities on the south-west coast, chiefly in Dorsetshire, where it frequents places along the coast, from Swanage to Preston, near Weymouth, and also the line of chalk hills from Swanage to Upaney. It has also been taken on the cliffs east of Sidmouth, and at Torquay, in Devonshire; and near Falmouth, in Cornwall.

The principal localities, though, are Lulworth Cove and the Burning Cliff, on the Dorset coast, where they may sometimes be found in plenty, settling on the wood brome grass (*Brachypodium sylvaticum*), on which the caterpillars feed.

This interesting addition to our meagre list of British butterflies, was made by my father, on August 15th, 1832. On that day he captured no less than three species new to Britain, viz.: *Hesperia Actæon*, *Habitophagus Curtisii*, and *Eucyrtus Mirabilis*. The middle one belongs to the interesting and curious order of bee parasites, to which the Rev. W. Kirby gave the name of Strepsiptera. It is one of the rarest of our British species, there being only two specimens in existence, and both captured by my father. The last is one of the parasitical Hymenoptera.

Hesperia actæon was first figured and described as a British species on the 2nd of March, 1833, by John Curtis, in his "British Entomology," and the name of the "Lulworth Skipper" bestowed upon it, accompanied by the following letterpress: "The insect at the top of the plate is the male, the other flying the female; the male at rest is represented of the natural size. We cannot often hope to record the addition of a butterfly to our British Fauna, but this species was discovered at Lulworth Cove, in Dorsetshire, last August, by J. C. Dale, Esq., through whose liberality it now ornaments most of our cabinets: it was found upon thistles, and was very local."

The exact place where the first specimen was captured is called Durdle Dove, and is situated to the west of Lulworth Cove.

Stephens, in his "Illustrations"—Appendix—published in 1834, writes, "I am indebted to the Rev. J. Lockey for this species; it was found by him in plenty near the Burning Cliff, in Dorsetshire: it has also been previously taken at Lulworth Cove, in the same county, in August."

Messrs. Humphreys and Westwood, in their "British Butterflies," 1841, writes, "This extremely local species was discovered in August, 1832, by J. C. Dale, Esq., near Lulworth Cove, in Dorsetshire, in considerable numbers, frequenting thistles. It has since been found by the Rev. J. Lockey, near the Burning Cliff, in Dorsetshire, in plenty."

Mr. S. Stephens, in a communication to the "Zoologist," Vol. V., 1847, writes, "This Skipper, which has been so scarce for the last eight or ten years, I had the pleasure of taking on the 2nd of August last in plenty under the Burning Cliff, on the coast of Dorsetshire, between five and six miles from Weymouth; I found a few on the flowers of the thistle and ragwort, but most on the flowers of a carex, which grew in clusters close to the beach. The insect was extremely local, being confined to a space of about one hundred yards. Mr. Dale, who kindly told me the locality whilst on a visit to his place, has

been to Lulworth (the original locality for the insect) for the last five years, and twice to this, without success, and it is now twelve years since he found it in plenty. I was a fortnight or three weeks too late, I regret to say, for I met with very few fine out of one hundred and thirty that I captured in five hours."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes: "In company, some years ago, with my friend J. C. Dale, Esq., late High Sheriff of Dorset, I formerly captured this, then newly by him discovered, insect, I mean as a British one, in plenty at Lulworth Cove, Dorsetshire—a charming place, where you will be fain to wish that you could for ever watch the glorious ocean, dashing up from its dark depths against the steep cliffs, which there presents an aspect of the utmost seclusion and the most lovely retirement. Wild must all around be in winter, but this small butterfly rejoices in the settled summer, more fortunate than some of its class, who are tempted out to woo the 'beautiful spring': often their reception is cold and chilling, and their day-dream of happiness is blighted, like the contemporary delicate flower that has peered out too soon from its sheltered nook, and must again hide its head for a season, till the skies are more propitious, and the sun shall shine undisturbed upon it. Now it is not to be seen there, though it is still to be found at the Burning Cliff, nearer Weymouth, where my friend, the Rev. Francis Lockey, of Swanswick Cottage, near Bath, has taken it in plenty."

Stainton, in his "Manual of British Butterflies and Moths," writes, "A very local species: Lulworth, Dorsetshire, and Sidmouth, Devonshire."

Mr. Douglas has given me the following note of his experiences of this insect in Dorsetshire: "In July, 1849, my late friend, H. H. Farr was staying at Weymouth for the benefit of his health. I stayed a few days in his company, and made some entomological excursions with him to Portland and other places adjacent. One bright sunny morning we hired a boat, owned by one of the amphibious long-shore dwellers, whom we took with us, and found he was a character, and could turn his hand and tongue to anything. An hour's sail across Weymouth Bay, during which we amused ourselves by catching mackerel, brought us to the desired spot, the Burning Cliff, where we had been told we should find *Pamphila actæon*, and there, sure enough, we found it in profusion. The spot, close to the sea, is a kind of undercliff, not very level, of no great extent, and covered with thistles and large tufts of a long coarse grass or carex, about which our prey were skipping briskly. So abundant were they that I often had five or six in my net at one stroke, and in about two hours I caught a hundred, filling my box and my hat; and Mr. Farr had nearly as many. They were accompanied by

a few of the common *P. linea*, which, in their flight they greatly resembled."

In the "Entomologists' Monthly Magazine," Vol. I., Mr. Trovey Blackmore writes, "This species seems to be very irregular in the time of its appearance. I took it in abundance, in very fine condition, in 1858, at the end of July, both at Lulworth Cove and at the Burning Cliff; whereas, the few specimens that I met with in the corresponding week this year, 1864, at the latter locality, were in a very wasted state, and had, apparently, been on the wing for some time. I met a member of the Entomological Society on the cliff, who had walked over there from Lulworth, where he had taken a few specimens in no better plight than mine."

My first capture of *Actæon* was made on the 27th of July, 1869, when I drove over to Lulworth and captured fourteen; also one of *Linea*, four of *Sylvanus*, two of *Corydon*, and several of *Galathea* and *Semele*.

Newman, in his "British Butterflies," 1871, writes, "We are indebted to the indefatigable Mr. Dale for the discovery of this insect at Lulworth Cove, in August, 1832, as announced by Mr. Curtis in his "British Entomology." I believe it to be extremely local—that is, frequenting particular spots, scattered at intervals all along the sea coasts of Dorset and Devon. The Warwickshire localities, although confidently spoken of, are very unlooked for, and are, I think, fairly open to doubt. Devonshire.—Extremely local, frequenting cliffs and coves on the coast, more especially cliffs east of Sidmouth and Torquay.—J. J. Reading; Mr. Hellins has also taken it near Sidmouth. Dorsetshire.—Lulworth and Burning Cliff by Holworth.—J. C. Dale."

Taken this year (1870) in two new localities, at Swanage and near Tyneham.—T. Parmister.—"Entomologist," Vol. 3., p. 179.

In the "Entomologist," Vol. XI., is the following communication from myself: "This little butterfly has been very scarce this year (1878), but last year it was in greater profusion than ever I have seen it. The earliest I captured was on June 20th, the last on September 4th. It is more widely distributed than is commonly supposed, as I have taken it in various places on the Dorset coast, from Swanage to Preston Preventive Station, which is about two miles from Weymouth."

It was also met with in 1877, by Mr. Wacey, on Ridway Hill close to Upaney.

In the "Entomologist," Vol. XVI, Mr. Benson writes, "Some years back I took *Hesperia actæon* in some numbers near Truro, Cornwall, in good condition and quite unmistakable; but have not seen it there since."

In 1888, it was on the wing at Lulworth as late as the 13th of September.

Hesperia actæon occurs at Lulworth in company with no less than four others of the Skipper family, viz.: *Sylvanus*, *Linea*, *Alveolus*, and *Tages*.

The best place is to the east of Lulworth Cove, on cliffs facing the sea. A little further on is a miniature undercliff. On this undercliff grows a mass of *Inula crithmoides*, below is the clear blue water of Weymouth Bay. In that little space, almost without moving, I have captured, or at least seen, no less than twenty-three of our British butterflies, viz.: *Pieris brassicae*, *rapae*, and *napi*; *Colias edusa*, with its var. *helice*; *Melanargia galathea*, *Satyrus semele*, *tilthonus*, *janira*, *megæra*, and *pamphilus*; *Chrysophanus phlæas*; *Lycæna corydon*, *adonis*, *alexis*, *agestis*, and *ægon*, and *Nisoniades tages*.

GENUS XXIII.—SYRICTHUS.

Boisduval.

This genus which is called *Thymeles* by Stainton and *Hesperia* by Kirby contains over sixty species, all of which are black, chequered with white spots. About fifteen of them are European, but only one British. In the folded structure of the costal margin of the fore-wings of the male, *Syrictus* is closely allied to *Nisoniades*, from which, however, they are distinguished by their strongly tessellated wings. The obtuse tip of the antennæ, destitute of a hook, separate them from the other genera.

SYRICTHUS ALVEOLUS.

Spotted Skipper.

ALVEOLUS, Hub. Alvèolus, a chess board, given in reference to the black and white appearance of the butterfly, which is chequered with somewhat square spots.

It is also called *Malvæ*, but the true *Malvæ* of Linnæus is apparently another species, according to the Vienna Catalogue, *Alcææ*, the caterpillar of which feeds on Malva.

This pretty little species measures from an inch to an inch and two lines in the expansion of its wings. On the upperside they are of a blackish brown, chequered with somewhat square white spots, and with chequered fringes. On the underside they are somewhat similar, the ground colour being greyish brown. A well known variety having the spots confluent was figured as long ago as 1717, by James Petiver, in his "Papilionum Britannicæ Icones," under the name of the Brown Marsh Fritillary. Lewin also gives three excellent figures of it in 1795, and calls it *Fritillum*, Fabricius. He records it as being but seldom met with in England, and that our know-

ledge of its manners is confined to the taking a few of them on the wing. He also goes on to say, this may not be a distinct species, but merely a variety in the white markings of its wings. It is described by Haworth as *Lavateræ*, and figured as such by Newman. It has been taken in Dorsetshire and other parts of the south of England, but is considered to be very rare. A still more extreme form of this variety is figured in Moseley's "Illustrations," from a specimen in the collection of Mr. Howard Vaughan, and called *Taras*, Meig. Both these later names apparently represent the same form, which Kirby calls *Fritillum*, W.V.

Both the type and the variety are subject to still other variations; the former frequently occurs with all the spots on the anterior wings very minute, while those on the posterior are remarkably large, and *vice versa*. Again, the variety occurs with the upper wings nearly all whitish or cream-coloured, with a single whitish spot alone in the centre of posterior, while others have a central and marginal fascia of spots.

In Mr. Stephen's collection was a specimen having the character of *Alveolus* on the anterior wing, and of *Lavateræ* on the other; and he also preserved a series gradually varying from the confluent to the simple spots on all the wings. Another named variety, *Melotis*, Dup., occurring in Syria, is larger, and has the hind-wings all white on the underside.

The egg is globular, with base rather flattened; the shell ribbed rather irregularly with about eighteen ribs, and transversely reticulated with very even fine lines: the colour is a very fine pale green all over.

The young caterpillar makes its escape by cutting a large round hole through the top of the egg; in colour it is very pale green, with a shining black head. When full-grown, the length is rather over five-eighths of an inch, the figure very stout, the head horny, globular, and stuck like a knob on the second segment, which however, is not so strikingly narrow as in *Nisoniades tages*; the skin granulated in appearance, the head and whole body covered with short fine pale hairs; the general colour a pale ochreous green, the second segment pink, the lines faintly darker than the ground colour; the head dark brown.—(Mr. W. Buckler). It feeds on the barren strawberry (*Potentilla fragariastrum*), the wood strawberry, the raspberry, and the bramble.

The chrysalis is enclosed in a case between two or three leaves, similar to that in which the caterpillar lives, but fastened with stouter silk, and the openings protected by a loose pale yellow webbing. Its length is not quite half an inch, the figure thick and stumpy; the eyes prominent; the wing cases well developed; the whole skin rather rough, set with short stiff hairs of a light brownish red; the ground colour is a reddish grey, on which are

situated some black marks and spots ; the spiracles are ringed with black and placed within the largest dark blotches.

The butterfly appears in May and June, and has been taken both in the end of April and the beginning of July. The caterpillars emerge by the end of June, and are full-fed in September. They remain in the chrysalis state over the winter.

S. alveolus occurs all over Europe except the extreme north, in Asia Minor, and North Africa. It is abundantly distributed in England and Scotland south of the Clyde, and has been met with at Galway in Ireland. It was first described as a British species in Ray's "Historia Insectorum," 1710 ; after describing it, he goes on to say, "Maii 29 in pascuis loco palustri inneni. Quarti generis Papilionum a nobis observatarum speciei primæ persimilis est quoad colores, sed multa minor."

It is figured and described by Petiver in his "Papilionum Britannicæ Icones," 1717, under the name of the Small Spotted Brown Marsh Fritillary.

Moses Harris, in his "Aurelian," 1778, writes, "Grizzle.—The whole fly is of a dark lead colour, speckled all over with small square specks. The fringes are chequered black and white. The underside is similar to the upper ; but the inferior wings are paler. Roesel says, the caterpillar is found on the common mallow, inclosed in a web ; that it lays in chrysalis eleven days, and that the fly, when it appears from the chrysalis, produces blood from the abdomen. See Linn, Papil. Pleb. 267, *Malvæ*."

Wilkes, in his "English Moths and Butterflies," 1773, figures for the Grizzled Butterfly, the butterflies and chrysalides of another species, also the caterpillars feeding on a plant of mallow ; and writes : "Mr. Roesel tells us, that the caterpillar of this fly was found on the mallow, with the leaves of which he fed it till the end of June, when it spun a web amongst the leaves, and changed to a chrysalis, the butterfly of which was bred the May following. This fly is to be taken in woods and meads, at the beginning of May ; and although small, it flies swiftly, so that you must be very quick to take it."

Donovan, in his "Natural History of British Insects," likewise figures another species, and writes "The larva of this butterfly feeds on the mallow ; the colour is greyish or yellowish, with the head black, and a black collar marked with four sulphur coloured spots. The pupa is somewhat gibbous and bluish. This insect is common in many parts of Britain in the fly state ; the larva, though known, is by no means common. The butterfly appears on the wing in May. Some collectors admit two or more varieties of the Grizzled Skipper Butterfly, while others consider them as so many distinct species : the male also differs from the female in being somewhat smaller."

The foregoing will show how much better it would have been for Harris, Wilkes, and Donovan, not to have copied from Fuesel : and that our species is not the *Malvæ* of Linnæus, which now goes under the name of *Alceæ*, Esp.

Lewin, in his "Insects of Great Britain," 1795, writes, "Spotted Skipper. *Malvæ*, Linnæus. The caterpillars of this butterfly feed on the leaves of the bramble bushes. They web the edges of the leaf together, and from this cover they come out a little way to feed; but the least motion of the leaf they return to their retreat, and if they be much alarmed, they drop to the ground. The end of April they are full-fed, when they enclose themselves in a slight web, under cover of a leaf, and there change to chrysalis. In that state they remain about fourteen days, as the fly comes out on the wing the beginning of May. The butterfly is pretty common in the dry parts of woods and heaths."

Haworth, in his "Lepidoptera Britannicæ," 1803, writes of *Malvæ*, "That it frequents pastures."

Curtis, in his "British Entomology," 1833, writes, *Alveolus*, Hub.—*Malvæ*, Haw.—*Cardui*, Goda.—End of May, beginning of June, meadows, commons, woods. *Malvæ*, Linn. I have found at Toulon, and believe it is not British, although Donovan's figures appear to be this species."

Stephens, in his "Illustrations of British Entomology," 1828, writes, "An elegant, variable, and far from uncommon insect; frequenting woods, commons, dry banks, and meadows, about the end of May, near Newcastle common. In the fens of Cambridgeshire, plentifully. *Malvæ* has considerable resemblance to *Tages*, but is easily known by its dentated wings. This species has doubtless been introduced into the indigenous fauna by Stuart, owing to the unfortunate misappropriation of the Linnæan name to *Alveolus* by his predecessors." In a manuscript note in my father's handwriting is "In the Linnæan cabinet are 2 *Malvæ* large and 2 *Alveolus* small put in as 4 *Malvæ*."

Haworth, in the old "Entomological Transaction," 1802, records another species, *Orleus* (The Georgian Grizzle), as being taken in Bedfordshire, by the Rev. Dr. Abbot. Evidently a mistake.

GENUS XXIV.—NISONIADES.

Hubner.

A genus of about fifty species, of which but two occur in Europe, and only one in Britain. They are mostly brown in colour, with ash-coloured undulating bars. The males have the costal margin of the fore-wings double, or

folded, the inside of the fold being covered with fine downy hairs, as in the last genus, from which they may be distinguished by the fringe of *Nisoniades* not being chequered. The antennæ are short, but longer and more slender than in *Syrichthus*; the club attenuated at the tip, not hooked. The butterflies of this genus sleep with their wings deflexed like a moth, not erect like other butterflies. Curtis remarks on the Skippers in general, "These singular insects approach the *Sphingidæ* in the extreme length of the maxillæ, and the *Noctuidæ* and *Phalænidæ* in their metamorphoses and doubly spurred posterior tibiae. The palpi are so densely clothed with scales and so very tender, that although the relative proportions are correct in fig. 4. a., the outline may vary a little. It is rather remarkable that old specimens have frequently lost one or both of their palpi, an accident I have never observed in other Lepidoptera, excepting a few of the *Pyralidæ*. Boisduval bestowed the name of *Thanaos* a corruption of *Thanatos*, death, in allusion to the dark colour of the species.

NISONIADES TAGES.

Brown Skipper.

TAGES, Linn. Ta'ges, a son of Genius, who first taught the Etruscans the art of divination. Linnæus probably chose this name for one of the *Ruriculæ*, because the story is told of *Tages* being found by a rustic while ploughing: hence a clod-hopper.

This, the last of our British butterflies, sleeps with its wings deflexed like a moth. It is of a dullish brown colour, with marginal rows of small pale dots; two obscure greyish bands on the fore-wings, and one on the hind-wings. On the underside, the colour is uniformly greyish brown. The width across the wings varies from an inch to an inch and a quarter. The male is more dusky and uniformly coloured than the female. The grey markings on the wings are sometimes more clearly defined in some specimens than others: the costa also has sometimes a bright white spot towards the tip, anterior to the band of zig-zags, and a spot or two in the band: otherwise it is remarkably constant to the type. A form named *Unicolor*, Fu., which as its names implies is unicolorous on the upperside, occurs in Greece and Western Asia. Another, named *Cervantes*, Graell., is found in Andalusia. It is larger than the type, and is more obscurely marked.

The egg is of a somewhat elliptical figure standing on end, and is pale green in colour.

The caterpillar is of a yellowish green, with two yellow lines on each side,

and a row of black dots above them: the head, like that of the rest of the family, is large, and is of a purplish brown colour: The spiracles are very small and red. When full-grown it is nearly three quarters of an inch in length, with the back a little arched and the belly rather flattened: the body is very plump, and thickest in the middle segments. It feeds on the Bird's-foot Trefoil (*Lotus corniculatus*).—(Mr. W. Buckler on "Larvæ" by the Ray Society.)

The chrysalis is smooth, without angles, the thoracic segments being swollen and of a dark green colour; the body is tinged with rosy red; it is conical and pointed. (Newman.)

The butterfly emerges in May, and it continues on the wing till June is well in. The eggs are laid on the food-plant, and as soon as the caterpillar is hatched, it conceals itself by drawing the leaves together. In the South of England, a second brood emerges in August, and the caterpillar lives over the winter; but there is only one brood in the North, and it passes the winter in the chrysalis state.

Nisoniades tages occurs all over Europe, except the Polar regions, in Northern and Western Asia, and Asia Minor; frequenting dry sunny places.

It is common all over England, and the South of Scotland, but occurs as far north as Invernesshire and Rosshire. It also occurs in Galway and probably other parts of Ireland. It appears to have been known as British as long ago as 1667, for Dr. Christopher Merrett gives the following description of a butterfly in his "*Pinax rerum Naturalium Britannicarum, continens vegetabilia, Animalia, et Fossilia, in hac Insula repecta inchoatus*," viz.: "*Corpore, pedibus, capitulo, antennis, cineritiis*."

It is described by John Ray in his "*Historia Insectorum*," 1710; and figured and described by James Petiver in his "*Papilionum Britanniae Icones*," 1717. Petiver records it thus, "*Papilo niger fuscus Hampstediensis marmoratus*. Handley's small brown butterfly. It is brown above and paler below, and dully marbled."

Moses Harris, in his "*Aurelian's Pocket Companion*," 1775, records it as haunting woods, heaths, and meadows.

Lewin, in his "*Insects of Great Britain*," 1795, writes, "This species of butterfly is to be seen flying the beginning of May, in the dry open parts of woods, and the sides of roads and lanes. It delights to settle on the ground to sun itself. The caterpillar is not known. In the male and females flies there is little or no difference, either in colour or markings."

Haworth, in his "*Lepidoptera Britannica*," 1803, records it as frequenting woods and meadows in May; unfrequent near London, but more frequent in in Norfolk.

Stephens, in his "Illustrations of British Entomology," 1828, writes, "Not a very abundant species, frequenting dry banks, wastes, commons, heaths, and woods, about the end of May and the middle of July: rather plentiful on Hertford Heath and at Darenth, and abundant at Coombe Wood, near Dover."

Curtis, in his "British Entomology," 1833, writes, "Beginning of May, June, and middle of July, meadows, dry heaths, banks, and road sides in various parts of England and Scotland."

The Rev. F. O. Morris, in his "History of British Butterflies," 1853, writes, "I have taken this Skipper in plenty near Charmouth and Lyme Regis, Dorsetshire and Devonshire. It is very abundant in Raydon Wood, Essex, and, in fact, in most parts of England. In Ireland it is plentiful near Galway; it is taken also in Scotland in different parts."

Newman, in his "British Butterflies," 1871, writes, "It is particularly plentiful in flowery chalk banks in Kent, Surrey, and Sussex. In England it occurs in every county list I have received."

ADDENDUM.

Since the previous pages appeared a new butterfly has been added to the British List, viz.

HESPERIA LINEOLA.

LINEOLA, OCH. Resembles *Linea* in size and colour, but the club of the antennæ is yellow, with a black tip; the hind wings are unicolorous beneath instead of the inner margin being fulvous. The black streak on the fore-wings of the male is shorter and quite straight, sometimes it is wanting.

The caterpillar is yellowish green with fine yellow lines on the back, and a yellow line along the sides. The range of this species is more extensive than that of *Linea*, as it is found throughout Northern Asia, as well as in Europe and North Africa, but it has only recently been recognized in England. It occurs in meadows in July and August, and is generally commonest along paths by the side of corn-fields.

It was first recorded as a British species in the Entomologist for January, 1890, by Mr. Hawes, as occurring in the County of Essex. Mr. Whittle also records it in the February number as occurring in abundance in July, on the marshes near Purfleet, close to Shoeburyness.

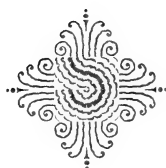
I have been on the watch for this species myself for years, and have come to the conclusion that it does not occur in the West of England. It is probably an Eastern not a Western species in Britain.

CORRIGENDA. ---

- Page xv.—Line 5. For “chysalides,” read “chrysalides.”
- „ xviii.— „ 36. For “to that,” read “instead.”
- „ xxiii.—Between lines 37 & 38 insert “1795, Typhon. Lewin's
Insects of Great Britain.”
- „ xxvii.—Line 2. Add “South of the Humber.”
- „ xxvii.— „ 3. Add “South of the Humber.”
- „ xxvii.— „ 23. For “South-west,” read “South Coast.”
- „ xxix.— „ 17. Insert “*rubi*.”
- „ xxxiii.— „ 6. After “belonging,” insert “to.”
- „ xxxiv.— „ 7. For “1858,” read “1868.”
- „ xxxiv.— „ 30. Insert “The mean on January 6th and 7th,
1890, were as high as 49' 9" and 51' 6".”
- „ xxxvi.— „ 36. For “*Napi*,” read “*Brassicæ* and *Rapæ*.”
- „ xxxvii.— „ 14. For “*Tabinidæ*,” read “*Tachinidæ*.”
- „ xxxvii.— „ 36. For “readers,” read “members.”
- „ xl.— „ 9. For “England,” read “Ireland.”
- Page 10.—After line 38 add—“and at Dover. A few specimens were
also taken on the east coast of Kent in 1887.
See Ento. Mo. Mag., Vol. xxiv.”
- „ 26.—Lines 27 and 28. Strike out the sentence beginning with
“but,” and ending with “facts,” and insert—
“Mr. McLachlan. in Entomologist's Monthly
Magazine for August, 1879, page 51, records
living chrysalides, the produce of eggs laid in
1877, and thinks that its life in that stage can
be prolonged over several years.”

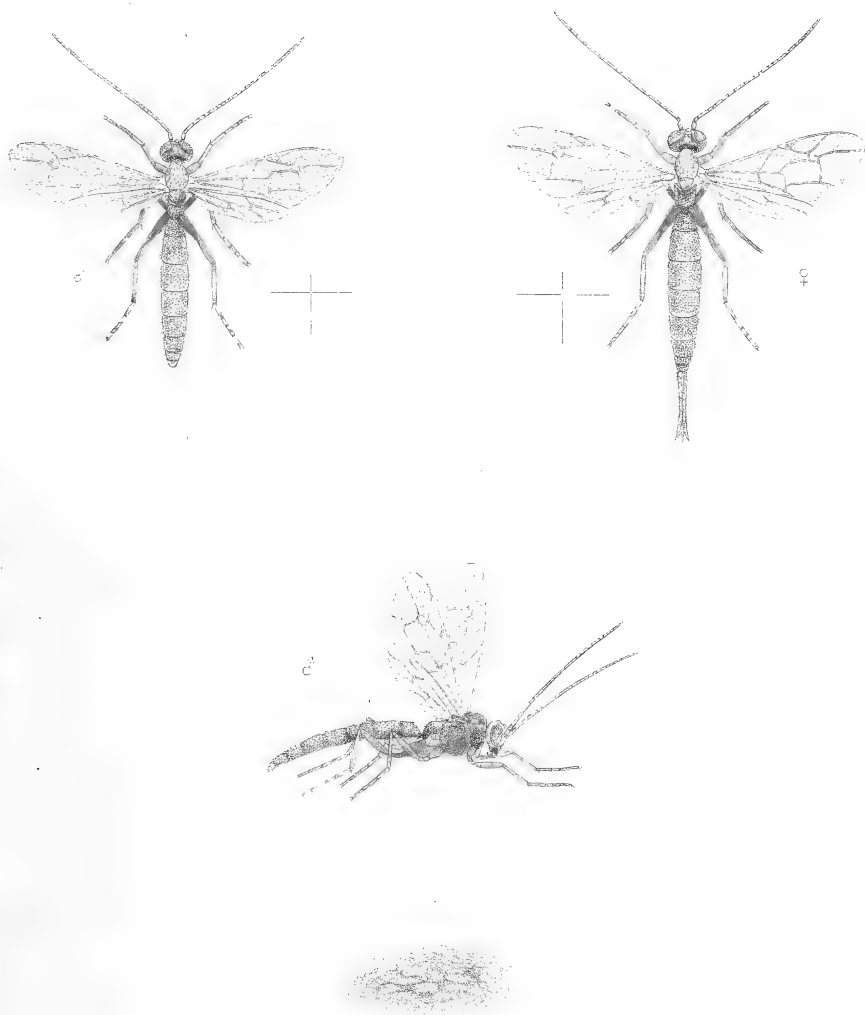
- Page 54—Line 9. Strike out “diminutive of Argos, a City of Greece,” and read—“from Argos, shining, in allusion to the silvery appearance of the underside of the wing.”
- „ 72— „ 10. After “colour,” insert “with raised glistening white reticulations, having projecting knobs at the knots. The caterpillar when full grown is of a dark green.”
- „ 72— „ 36. Strike out “Hoy, the most northernly of the Shetlands,” and insert “The Orkney Isles, where it has been met with both on the main island, and at Hoy.”
- „ 73— „ 22. For “Alexis,” read “Medon.”
- „ 73— „ 24. For “Alexis, Scop,” read “Medon, Esper.” As Scopoli grouped together two or three species under the name of Alexis, it is impossible to tell which he meant by the name.
- „ 97— „ 36. For “*Rhagas*,” read “*Rhogas*.”
- „ 104— „ 35. For “*Calorii*,” read “*Caloris*.”
- „ 127— „ 1. For “Cranor,” read “Cramer.”
- „ 127— „ 11. For “Petiner,” read “Petiver.”
- „ 174— „ 8. For “1877,” read “1887.”
- „ 192— „ 24. For “Puby,” read “parley.”
- „ 196— „ 18. For “Sandwich,” read “Sandrock.”
- „ 199— „ 2. For “Fitillary,” read “Fritillary.”
- „ 199— „ 3. For “Omai,” read “Omri.”
- „ 211— „ 4. After “Italy,” add “or from *Hesperia*, the evening the *Hesperidæ*, forming the connecting link between the Diurni and Nocturni.”
- „ 216— „ 29. For “Hag,” read “Hog.”
- „ 217— „ 37. For “*Sylvaticum*,” read “*Pinnatum*.”
- „ 218— „ 37. For “Upaney,” read “Upiney.”
- „ 222—After line 11 insert “*Syricthus* from *Syrex*, a pipe, some of the markings being supposed to resemble a Pan’s pipe.”

Page 222—After line 34, insert “*Nisoniades*, perhaps an error for *Bisoniades*, resembling a bison, given in allusion to the shaggy and heavy appearance of the species.”



Hartlepool :

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PIMPLA RUFIPLEURA.



Supplement to the Young Naturalist.

THE HISTORY
OF OUR
BRITISH BUTTERFLIES

CONTAINING—

A FULL BIBLIOGRAPHICAL NOTICE OF EACH SPECIES, WITH
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DESCRIPTIONS OF ALL THE BRITISH SPECIES, THEIR EGGS,
CATERPILLARS, CHRYSALIDES AND VARIETIES, WITH A NOTICE
OF THEIR HABITS, LOCALITIES, FREQUENCY, &c., &c.,

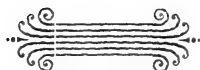
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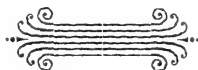
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The distribution of Butterflies in the British Isles, as known at the present time may be stated thus :—

Papilio machaon. England east, in the fens.

Aporia crataegi. England south.

Pieris brassicæ. England, Ireland, Scotland, Hebrides, Orkneys, Channel Islands.

P. rapæ. England, Ireland, Scotland, Hebrides, Orkneys, Channel Islands.

P. napi. England, Ireland, Scotland, Channel Islands.

P. daplidice. England south east, Channel Islands.

Anthocaris cardamines. England, Ireland, Scotland, Channel Islands.

Leucophasia sinapis. England, Ireland, Channel Islands.

Gonopteryx rhamni. England, Ireland south, Channel Islands.

Colias edusa. England, Ireland, Scotland, Orkneys, Channel Islands ; erratic.

C. hyale. England, Ireland, Channel Islands ; erratic.

Thecla betulæ. England, Ireland.

T. quercus. England, Ireland, Scotland, Channel Islands.

T. w-album. England, Channel Islands.

T. pruni. England east.

T. rubi. England, Ireland, Scotland, Channel Islands.

Chrysophanus dispar. England east, in the Fens. Extinct since 1850.

C. phlæas. England, Ireland, Scotland, Channel Islands.

Polyommatus boeticus. England south, Channel Islands ; erratic.

P. argiades. England south, in Dorsetshire on heaths.

P. argiolus. England, Ireland, Channel Islands.

- P. arion.* England, southern and midland counties.
- P. acis.* England, south ; probably extinct.
- P. alsus.* England, Ireland, Scotland.
- P. corydon.* England, on the chalk and limestone.
- P. adonis.* England south, on the chalk and limestone.
- P. icarus.* England, Ireland, Scotland, Hebrides, Orkneys, Channel Islands.
- P. agestis.* England, Scotland, Channel Islands.
- P. Ægon.* England, Ireland, Scotland, Channel Islands.
- Nemeobius lucina.* England, Scotland south-west.
- Melanargia galathea.* England, on the chalk and limestone.
- Hipparchia ægeria.* England, Ireland, Scotland, Channel Islands.
- H. megæra.* England, Ireland, Scotland, Channel Islands.
- H. semele.* England, Ireland, Scotland, Channel Islands.
- H. tithonus.* England, Ireland, Scotland, Channel Islands.
- H. janira.* England, Ireland, Scotland, Hebrides, Channel Islands.
- H. hyperanthus.* England, Ireland, Scotland, Channel Islands ; in woods.
- Cœnonympha typhon.* England north, Ireland, Scotland, Hebrides, Orkneys, Shetland ; on moors.
- C. pamphilus.* England, Ireland, Scotland, Hebrides, St. Kilda, Channel Islands.
- Erebia medea.* England north, Scotland south and central ; woods, moors, and mountains.
- E. epiphron.* England north-west, Ireland north-west, Scotland central ; on high mountains.

- Danaïs plexippus*. England south-west ; wanderer.
Apatura iris. England, in woods.
Limenitis sibylla. England, in woods.
Vanessa cardui. England, Ireland, Scotland, Orkneys,
 Shetlands, Hebrides, Channel Islands ; erratic.
V. atalanta. England, Ireland, Scotland, Orkneys,
 Shetlands, Hebrides, Channel Islands.
V. antiopa. England, Ireland, Scotland, Channel
 Islands ; erratic.
V. io. England, Ireland, Scotland, Channel Islands.
V. urticae. England, Ireland, Scotland, Channel
 Islands.
V. polychloros. England, Channel Islands.
V. c-album. England, Channel Islands.
Argynnis paphia. England, Ireland, Scotland.
A. adippe. England, in woods.
A. aglaia. England, Ireland, Scotland, Channel
 Islands.
A. lathonia. England east and south, Ireland south-
 west, Channel Islands.
A. euphrosyne. England, Scotland ; in woods.
A. selene. England, Ireland, Scotland.
Melitæa cinxia. England south-west, Channel Islands.
M. athalia. England south, Ireland south.
M. artemis. England, Ireland, Scotland.
Cyclopides paniscus. England.
Hesperia comma. England, on the chalk.
H. sylvanus. England, Ireland, Scotland, Channel
 Islands.
H. linea. England, Ireland, Channel Islands.
H. actæon. England, south-west coast.
Syriethus alveolus. England, Ireland, Scotland south-

west, Channel Islands.

Nisoniades tages. England, Ireland, Scotland, Channel Islands.

Of the above 67 species, the whole have been taken in England; 40 in Ireland; 36 in Scotland; 8 in the outer Hebrides; 7 in the Orkney Isles; 3 in the Shetlands; 39 in the Channel Islands; and only one solitary butterfly has been taken in the small and far-away Isle of St. Kilda.

In Central Europe, or Germany, 186 species of Butterflies have been observed; the remaining 140 European species being peculiar to Spain, Italy, Greece, Russia, or Lapland.

Of the German species, just 100 occur in Belgium, but only 66 in England, although we possess one species (*Erebia epiphron*) which does not occur in Belgium.

One of our species appears to have a very restricted distribution. This is the now extinct *Chrysophanus dispar*, which seems to have been confined to England, though its variety *rutilus* inhabits Central and Eastern Europe and North and West Africa.

Next we have *corydon*, *lucina*, *sibylla*, *typhon*, *epiphron*, and *galathea*, all of which seem to be confined to Europe proper, and in most cases to Central Europe. None of them, except *typhon*, range very far north, though probably one or two reach Asia Minor.

The next lot occur in Europe and in North and West Asia, and include *sinapis*, *cratægi*, *betulæ*, *quercus*, *pruni*, *w-album*, *arion*, *acis*, *alsus*, *iris*, *medea*, *semele*, *hyperanthus*, *megæra*, *polychloros*, *adippe*, *cinxia*, *paniscus*, and *tages*.

The 41 species which remain have a wider range.

Of these at least seven, viz., *machaon*, *hyale*, *edusa*, *alexis*, *agestis*, *phlæas*, and *lathonia*, reach the Himalayas; while two others, *brassicæ* and *argiolus* have representative forms there. Three at least reach Japan, namely, *edusa*, *hyale*, and *io*.

A rather large number occur on the south side of the Mediterranean, and are recorded for North Africa, viz., *machaon*, *daplidice*, *rapæ*, *brassicæ*, *rharni*, *edusa*, *hyale*, *argiolus*, *adonis*, *alexis*, *argiades*, *agestis*, *bætica*, *rubi*, *phlæas*, *atalanta*, *antiopa*, *lathonia*, *artemis*, *janira*, *ægeria*, *pamphilus*, *linea*, and *actæon*. One (*hyale*) occurs in South Africa, where *edusa* is represented by the closely-allied species *electra*.

In North America, but chiefly on the western side of that continent several species are said to have been found. Of these *machaon*, *antiopa*, *atalanta*, and *phlæas* seem certainly to occur; while *hyale*, *edusa*, *rhamni comma*, *sylvanus*, and *linea* have all been reported, and if they do not actually occur they are represented by species very closely allied, as also are *c-album*, *aglaia*, and *argiolus*. A supposed variety of *rubi* has been found in California, and *rapæ* has been introduced into Canada, &c., in late years, and seems already to have developed a climatic race.

Finally, *cardui* appears to occur nearly all over the world, except in South America.

Of the species mentioned above, 21 have been found within or near the Arctic Circle, namely, *machaon*, *cardamines*, *napi*, *alexis*, *acis*, *agestis*, *agon*, *phlæas*, *rubi*, *antiopa*, *urticæ*, *athalia*, *selene*, *euphrosyne*, *aglaia*, *lathonia*, *tithonus*, *pamphilus*, *typhon*, *aloeolus*, and *comma*.

Five of our butterflies hibernate—that is, pass the winter—in the egg state, viz., *quercus*, *w-album*, *pruni*, *betulæ*, and *agon*.

Thirty-nine hibernate in the larva or caterpillar state—*cratægi*, *corydon*, *adonis*, *alexis*, *agestis*, *argiades*, *alsus*, *acis*, *arion*, *dispar*, *phlæas*, *galathea*, *semele*, *janira*, *tithonus*, *hyperanthus*, *ageria*, *megæra*, *epiphron*, *medea*, *davus*, *pamphilus*, *iris*, *sibylla*, *paphia*, *adippe*, *aglaia*, *lathonia*, *euphrosyne*, *selene*, *artemis*, *cinxia*, *athalia*, *linea*, *actæon*, *sylvanus*, *comma*, *paniscus* and *tages*. The first named differs from the rest in being gregarious in the larva state, and in passing the winter under cover of a web.

Twelve hibernate in the pupa, or chrysalis state—*machaon*, *edusa*, *hyale*, *brassicæ*, *rapæ*, *napi*, *daphidice*, *cardamines*, *sinapis*, *lucina*, and *alveolus*.

Eight hibernate in the imago or perfect state—*rhamni*, *io*, *antiopa*, *polychloros*, *urticæ*, *c-album*, *atalanta*, and *cardui*. Many of these creep into hollow trees, others hide in houses or outhouses, and imagines of *urticæ* have been found in the crevices of chalk nearly a foot below the surface.

All our British butterflies (with the exception of the Wood White and the Speckled Wood) are true children of the sun. Their flight is varied, and the skilful collector knows at a distance the flight of different genera, and even occasionally that of different species; thus, my father could distinguish *acis* on the wing from the common *icarus*. The power of flight depends considerably on the robustness of the

thorax and the strength of the wing veins; thus some of the *nymphalidæ* are more powerful fliers than the great Swallow Tails; such, for instance, is the case with the Painted Lady. Others—as the whites and browns—fly with an undulating motion, whilst the Purple Emperor sails over the topmost branches of the oak. Others—as the Skippers—have a short, quick jerking kind of flight. The sexes, though generally resembling each other, occasionally offer various distinctions, especially in colour, the males in such cases being almost invariably the most gaily coloured. This is especially the case with the Purple Emperor, the Blues, and the Coppers. In these the upper surface alone offers this distinction; the Orange tip, however, has tips to the forewings coloured orange on the underside as well as on the upper. In the purple hair-streak the individuals which have a bright purple patch on the upper surface of the wings are the females, as is also the case with the Brown Hair-streak, except that in this species the patch is a dull orange. Some of the Fritillaries have black longitudinal ribs on the forewings of the males, and Haworth describes the female of the Red Admiral as differing from the male by possessing a minute white dot on the central red fascia of the forewings. In the genus *Colias*, or Clouded Yellows, the males exhibit a character generally overlooked by entomologists. It is a kind of glandular sac placed upon the anterior edge of the hind wings near the base. It is large in *edusa*, and entirely wanting in *hyale*. *Edusa* has a whitish variety of the female, on which the name of *helice* has been bestowed; and *paphia* has a dark greenish one, which is called *vallezina*. The females of *janira*, *corydon*, and *adonis*, occasionally, but very rarely, appear with the coloration of the male.

The variations in the colours and markings of the different species are very numerous, still some general principles are evident. Thus, the *Pieridæ* are almost uniformly white; *Colias* and its allies, yellow; the Fritillaries, rich fulvous with black spots, and silvery ones on the under side; *Satyrus* and its allies are of various shades of brown with eye-like spots; the species of *Chrysophanus* are of a copper colour, and of *Polyommatus* blue, with small eye-like spots on the under surface; whilst those of *Thecla* have hair-like streaks on the under sides. Variations in colours may also be seen in individuals of the same species; thus, you may get a black variety of the White Admiral, a brown variety of a Blue and White, or bleached variety of the Meadow Brown.

The eggs of butterflies differ very remarkably both in size and shape. In some the surface is most beautifully ornamented as with carved work, but a thousand times more delicate and fine than any carving that human hands could execute. Some are exquisitely fluted, others are ribbed, the ribs being from ten to thirty in number, and these are connected by a great number of excessively minute transverse raised lines; some are entirely covered with a net-work of raised lines, others have rows of minute warts, forty or fifty in number, all of which converge to a point at the top of the egg; others are perfectly smooth and without markings of any kind; and some few of them have a lid at the top, which the young caterpillar gently lifts off when he makes his first appearance in the world.

One of the most curious and striking facts, is the extreme difference in the eggs of some species which in the perfect state closely resemble each other. Thus the egg of the Large Tortoise-Shell is pear-shaped and smooth, while that of the Small Tortoise-shell is oblong, with eight very conspicuous ribs. The characters of each are, however so constant in each species of butterfly, that any one who has paid attention to the subject can immediately say to what butterfly any particular egg belongs. Thus the egg of the Peacock is like a polygonal jar, the egg of the Meadow brown is globular, that of the Large white reminds us of some antique vessel, and that of the Queen of Spain, simulates curious wicker-work baskets.

Our British Rhopalocera or butterflies are divisable into three primary groups or tribes, and into eight families, thus:—

Tribe I. *Succinta*. Pupa attached by the tail and by a belt of silk round the body, head pointed upwards.

Family I. *Papilionidæ*. Larva elongate, smooth or pubescent, Imago with six feet in both sexes.

Family II. *Lycenidæ*. Larva short and thickset, in shape something like a woodlouse. Imago with six feet in both sexes.

Family III. *Erycinidæ*. Larva short and thickset, in shape something like a woodlouse. Imago with four feet in the male and six feet in the female.

Tribe II. *Pendulæ*. Pupa attached only by the tail, and hangs with head downwards. Imago with four feet in both sexes.

Family IV. *Satyridæ*. Larva with a bifid tail, like a fish.

Family V. *Danaidæ*. Larva with from one to five pair of fleshy prolongations.

Family VI. Apaturidæ. Larva like a slug, with a pair of horns on its head.

Family VII. Nymphalidæ. Larva covered more or less with spines.

Tribe III. INVOLUTÆ, Pupa enclosed in a more or less transparent cocoon. Imago with six feet in both sexes.

Family VIII. Hesperidæ. Larva elongate, with a large head.

In the Satyridæ, Danaidæ, Apaturidæ, and Nymphalidæ, the perfect insects or imagines have the first pair of legs in a very rudimentary state, and quite unfitted for walking, so that in ordinary language they have only four legs. In the Erycinidæ, the males have only four useful legs, though the females have six. The other three families have always six serviceable legs in both sexes.

These families are also readily distinguishable in the earlier states; for the larva, or caterpillar, as they are more commonly called, of the Papilionidæ are elongate and of the ordinary form; the larvæ of the Lycænidæ and of the Erycinidæ are broad and short, and are termed onisciform, that is shaped like a woodlouse; the larvæ of the Satyridæ are elongate and have two short projecting tails, and are termed pisciform, that is shaped like a fish; the larvæ of the Apaturidæ have two projecting horns on the head and are termed Limaciform, that is shaped like a slug; the larvæ of the Nymphalidæ are armed with spines or bristly hairs; and those of the Hesperidæ have large heads.

The pupa or chrysalides of the Papilionidæ, Lycænidæ and Erycinidæ, are termed girted, that is, the caterpillars when changing to the chrysalis state, attach themselves to a wall, bit of stick, or grass stem, as the case may be, by their tails and with a girdle of silk round the middle of the body, with the head pointed upwards; whilst those of the Satyridæ, Danaidæ, Apaturidæ, and Nymphalidæ, are simply attached by the tail with the head pointed towards the ground. On the other hand the caterpillars of the Hesperidæ when entering the pupa or chrysalis state, spin a more or less transparent cocoon, thus resembling the habits of some moths more than any of the other butterflies, if we except *Hipparchia semele*, and *Doritis apollo*.

The caterpillars of butterflies feed exclusively on the leaves and flowers of plants, and plants of the same natural family are especially liable to the attacks of allied species of caterpillars, the affinities of one confirming those of the other. Thus those of the genus *Pieris*,

or white butterflies feed on the Cruciferæ, those of *Colias* in the herbaceous Leguminosæ, of *Argynnis* on Violets, of *Thecla* on trees and shrubs, of *Melitæa* on plantain and allied plants, of *Satyrus* and *Hesperia* on various species of grass. Two allied species of *Vanessa*, *urtica* and *polychloros*, feed respectively on the nettle and the elm, belonging two allied genera of plants.

The number of butterflies which have been described from various parts of the earth is very great, equalling that of the birds, both being over 7,700, but by far the greater number of butterflies come from the East Indies, and tropical America. A single genus, *Papilio*, contains over 500 species, but only 4 of these occur in Europe.

Some of these insects have afforded materials to several entomologists for the production of elaborate memoirs upon their anatomy. Swammerdam especially, (in his History of Insects), investigates that of the Large Cabbage-white and the Small Tortoise-shell. Herrald has also studied the former species, tracing the variations which its internal organs undergo during the process of transformation.

That weather has an immense influence upon insect life cannot be denied, especially with regard to butterflies. Thus we find plenty of them sporting about in all directions in fine hot weather, and enjoying the beneficial warmth of the genial sunshine. On the other hand in cold wet summers we come across very few. There are of course notable exceptions, for instance the remarkable swarms of *Vanessa cardui* during the wet, sunless, and ungenial season of 1879. Another species which was also abundant that year was *Hipparchia ægeria*. This insect is remarkably fond of shade and moisture, the wet climate of Dunegan in the Isle of Skye seeming to be well adapted to its requirements. On the other hand a wet year is not necessary for an abundance of *Cardui*, as it was excessively common in 1826 and 1884; years which had very fine summers and autumns.

The wettest years of the present century are :—1815, 1836, 1848, 1852, 1860, 1872, 1879, and 1888. The wettest seven consecutive years are those from 1879 to 1881, years bad alike to the farmer and to the entomologist. No others are known. There are however two instances of five consecutive wet years—1772 to 1776 and 1827 to 1831. 1772 to 1776 had a mean excess of 17 per cent, 1827 to 1831 of 9 per cent, 1875 to 1881 of 13½-per cent. The driest years of the present century are :—1800, 1808, 1826, 1834, 1844, 1854, 1855, 1858, 1864, 1868, 1870, 1874, 1884, and 1887.

In 1800 no rain fell for 74 days till the 19th of August, when a glorious rain came down. This record was however beaten by one of a much earlier date, that of the year 1102, which was so hot and dry that forests, and fields of standing corn took fire. The year 1826 is recorded as being the hottest year for 63 years, and that, as in 1768, the hot summer was followed by an unusually mild and open winter and spring. 1858 also was a year of extreme heat, every month with the exception of October and November being above the average. On 7 days the thermometer stood above 90° December was also a remarkable month, being one of the warmest, wettest, and most stormy on record, with thunder storms almost daily. 1870 was another fine year, but not so hot as 1868. 1887 had a remarkably fine summer, lasting from the early part of June to the 27th of August. The remainder of the year was however very wet, as were also the months of April and May.

A remarkable contrast is afforded by the two successive years 1887 and 1888. In the two months of June and July, 1888, there were 507 hours of brilliant sunshine, whilst in June and July, 1887, there were only 227 hours of sunshine at all. The year 1888 is more remarkable for containing the two coldest days on record in July, the 13th and 14th. The mean temperature on the former day was as low as 46·2° and on the latter 48·1°, whilst the lowest records in July of any previous years are 47·7° in July 20th, 1836, and 48° in July 8th, 1856. The lowest temperature reached on 13th July, 1888 was 42·8°, and the highest 55·7°. This unseasonable coldness was due to the frequent and heavy rainfall, and the fact that heavy falls of snow took place in the mountainous regions of Great Britain, and even in some central parts of England. (In 1885 snow fell on 16th May). It will not be difficult to find two days in the month of January of higher temperature than these two in July, 1888.

The most severe winters of the present century are those of 1795-96, 1813-14, 1829-30, 1837-38, 1854-55, 1860-61, 1870-71, and 1880-81. In the winter of 1813-14, the Thames was frozen over so hard that a fire was lighted upon it and an ox roasted. It was frozen over also in the winter of 1795-96, 1829-30, and 1880-81. The coldest March is probably that of 1888. Cold springs with North-easterly winds, and frosts in May, appear to have a more injurious effect upon insect life than severe winters. Such for instance as that of 1861 when the oaks which came out early, had all their leaves blackened and cut off by the

frosts. Winds and gales have also an injurious effect upon insect life, such as the heavy gale of April 29, 1882 which was the strongest since 1830. In that storm the wind was greatly impregnated with salt, which irretrievably injured vegetation of all kinds, and even at Chichester, 9 miles from the sea all the windows of the houses were covered with salt spray. The year 1867 had a very cold and frosty May; there was a very short period between the latest spring, and the earliest autumn frost; the latest spring frost being on 29th May and the earliest frost in autumn being on the 31st August. It is difficult to say what influences the abundance of particular species in certain years, but it appears evident that fine sunny summers are most productive of butterfly life, such as those of 1870 and 1887 for the Blues, and a hot one as 1868 for *Colias hyale*; 1877, the great year for *Colias edusa* had a remarkably fine September. A long continuance of easterly winds in the late summer and autumn of 1872 seems to bring to our shores such rarities of ordinary years, as *Antiopa*, *Lathonia*, and *Daplidice*. On the other hand, weather apparently has very little effect on *Cardui* or *Janira*. However it is very evident that the same season that is favourable for *Antiopa*, is likewise so for *Lathonia* and *Daplidice*, whilst *Cardui* is generally accompanied by *Plusia gamma*, and *Edusa* by *Scopula ferrugalis*.

Another subject worth considering is the disappearance, or increasing scarcity of certain species. Sometimes we have a cold summer with rarely a glimpse of sun, and frequent chilly rains (preceded or followed by a severe winter). In such a season butterflies are seldom seen on the wing, and their chances of pairing and depositing their eggs are few. Diurnal species become torpid on a dull day, and a continuance of dull days is fatal to them, and were it not for a wonderful amount of recuperative power, and a few favourable seasons coming together, we should have still fewer butterflies than we have at the present time. But cold weather at the time that the perfect insects should appear is not the only thing they suffer from. Open winters, and mild weather in February and March, tempt hibernating caterpillars from their winter retreat, and after they have begun to feed again, they are much less able to resist the frosts we sometimes get afterwards in the months of April and May, such as we had in 1867, and 1885, in which latter year, snow fell on the 16th of May. The salt storms also of April 29th, 1882 had a most disastrous effect on the insect life of that year, many of the spring caterpillars being

starved to death for want of food. It has often been stated that mild open winters, cold ungenial springs, and rainy and sunless summers are the chief causes of the diminution of the numbers of our butterflies. Facts tend to prove that it is due rather to a conjunction of unusually severe winters, and wet sunless summers. The last specimens of *Machaon*, *Cratægi* and *C-album* taken at Glanvilles Wootton were in the year 1815 and 1816. Let us consider that period. The winter of 1813-14 was so severe that an ox was roasted on the Thames, and the author of the "Journal of a Naturalist" informs us that the summers of 1815, 1816, and 1817 were unceasingly cold and rainy. *C-album* used also to occur abundantly near Hertford previous to 1813, and at Epping about 1817 or 1818. *Machaon* also used to occur in Hampshire, Somersetshire, Gloucestershire, Glamorganshire and Yorkshire previous to 1819. Another species, *Polyommatus æis* became very scarce at that period, but it got common again in 1819 and particularly so in 1825 and also in 1835. Then 1836 had a very wet and ungenial summer in which only one specimen was seen at Glanvilles Wootton, this was followed by a severe winter; after which the records in my father's journal are, a few in 1837, none in 1838, scarce in 1839 and 1840, and a pair in 1841 (being the last ever seen alive in Dorsetshire), which was another very wet year. Another species not observed at Glanvilles Wootton after that year is *Thecla betulæ*. Now we arrive at another disastrous period, that of the seven consecutive wet years 1875-1881, including the excessively wet summer of 1879, and the severe winter of 1880-81. Since those years no specimen of *Acis* has been seen in Britain, nor any of *Arion* except a few in 1884. *C-album* also almost disappeared, but increased again in the Welsh and neighbouring counties of England in 1886. *Cratægi* disappeared at that period, the only specimens taken since, being a few in Kent during the fine summer of 1887.

The other two bad epochs, 1827-31, and 1860-63, appear to have done nothing beyond thinning the ranks of various species. For instance my father did not see one single specimen of *Gonepteryx rhamni* during the whole year of 1861, and it was also scarce for two or three years afterwards, as was also *Phlaas*.

Other records of the scarcity of particular species are those of *Napi* in 1868, a fine hot summer; of *Atalanta* in 1845; of *Janira* in 1867; and of *Megara* in 1860-63, during which the species disappeared entirely from large districts in the North of England and Scotland, in

some of which it has never re-appeared. Years frequently occur in which *Edusa*, *Hyale*, *Cardui*, *Antiopa*, *Lathonia*, and *Daplidice*, are all, or many of them entirely absent.

The most favourable years for the production of insect life have been 1794, 1798-1800, 1808-12, 1818-26, 1830-35, 1842-44, 1855-59, 1868-72, and 1887. Of these 1794, 1826, 1842, and 1870 were particularly good years; indeed 1826 goes by the name of the "Annas Mirabilis" of British Entomologists.

Before departing from this subject it must however be borne in mind that atmospheric changes are not the sole cause of the scarcity or disappearance of butterflies. The drainage of Whittlesea Mere, in 1851, caused the loss of *Chrysophanus dispar*. An increase too of their parasitic enemies among the Hymenoptera, and of the Dipterous family *Tabinidæ* do much towards reducing their numbers. In 1853 and 1854 there was a plague of the caterpillars of *Brassicæ* in Sussex. During the latter season owing to the attentions of *Apanteles glomeratus*, the number of fly-blown caterpillars was incredible, so much so that there was almost a total cessation of the plague in 1855. An increase also in the number of small birds does much towards reducing the number of caterpillars, which form to a great extent their natural food. In fact they may have had more to do with the disappearance of *Cratægi*, than bad seasons.

It has been mooted that melanism is produced by atmospheric conditions. Be this as it may, it is certain that more rain falls in the North of England, where melanism is most frequent, than in the South. On the average there are 350 days on which rain falls in the North and West of England, against 150 days in the South and East. The Sty Head in Cumberland is reckoned to be the wettest place in England, and Cambridge to be the driest. Let us take for instance the rainfall of one year, that of 1881. At the Sty Head it amounted 172.56 in. at Cambridge to 18.41 in. A quantity of rain also falls in the New Forest, and in Ireland. On the other hand, brilliant and light colours hold the sway in the sunny South, and especially on the South Downs, the chalk soil of which absorbs a considerable amount of heat favourable to the development of such species as *Galathea*, *Corydon*, and *Adonis*. Lord Walsingham in an address to the readers of the Yorkshire Naturalists' Union in 1885, argues that northern and mountain species of Lepidoptera are dark, because dark colours absorb heat. Is such the case? I say no! The dry chalk soils of the south absorb a greater

amount of heat than the wet peaty soils of the north, and to that, in conjunction with the fact that there is more rain, and consequently less sunshine in the north, is melanism entirely due. Why even in the South of England darker varieties occur on cold wet lands than on light dry soils, which absorb a greater amount of heat from the rays of the sun. Extreme heat has also a tendency to produce white varieties of the Blues, thus we find a white variety of *Corydon* in Andalusia named *Albicans*. But it may well be asked what effect has heat on the Whites? The tendency is to produce yellow varieties, such as the variety *Nov-angliæ* of *Pieris rapæ*.

Pieris napi affords another instance of the effect of strong sunlight. The spring brood which occurs in May is much darker and more strongly marked than the summer brood which occurs in the month of July, when the days are longer and the sun more powerful. On the Alps a very dark variety of the female named *Bryoniæ* occurs. Besides the fact that the brightest colours which exist in nature are those which we see in insects and birds that are most exposed to the direct rays of the sun; the brightest parts of these birds and insects are those which catch these rays in a greater degree than others; hence the upper sides of butterflies are more highly coloured than the under, a notable instance is found in *Vanessa io*.

The question of nomenclature is a very difficult one to decide. The British Association adopted certain rules for Zoological nomenclature. The most important of these rules was that the 12th Edition of the *Systema Naturæ* of Linnæus should be taken as the starting point. Surely the last and carefully revised edition of so great a work is a safer starting point than an earlier, and admittedly imperfect edition. Mr. Kirby in the supplement to his great Catalogue of Butterflies goes back to the 10th Edition. But if we go back at all, why not go still further? Why not go back to the *Fauna Suevica* published in 1746. Surely if he goes back from 1767 to 1758, he may as well go to 1746. Then we shall have to adopt *Ammiralis* for *Atalanta*, and *Principissa* for *Lathonia*, except indeed we go still further back to 1717 and call the latter *Cantabridgensis*, Petiver. And surely the descriptions given by Petiver and by Linnæus in his *Fauna Suevica*, are equal in point of merit, if not superior to those of Hufnagle. When Guenée and Doubleday prepared their lists they examined all the authorities for themselves, and rejected for various reasons the works of authors whose figures or descriptions were unsatisfactory. Now-a-days an

Entomologist finds in an old library, an unknown or rejected work, by an obscure writer, with imperfect descriptions. He hastens to make his discovery known to the entomological world, thinking to benefit science by bringing forward prior names to those in general use. But it is injurious to the cause of science to alter a name that is thoroughly established and in general use, and adopted by all the great authors of former days. The question is, as I have said above, a very difficult one, and I have probably erred myself on the subject, but let all those desirous to propose changes of well known names look carefully through the earliest editions of all the old authors, and not fall into such mistakes as Staudinger made in proposing the name of *Sinon* for *Podalirius*, and Kirby in proposing *Croceus* for *Edusa*. Fabricius bestowed the name of *Edusa* upon the clouded yellow in 1776, but Kirby, on the supposition that he did not do so till 1787, gave preference to that of *Croceus*, given by a writer called Fourcroy in an old forgotten work on the Entomology of Paris, published in 1785.

The origin of our British Lepidoptera is a subject of great interest; and in an article on the subject on the "Entomologist's Monthly Magazine," Vol. VIII. p. 45, Dr. Jordan writes: "The British Isles were, without doubt peopled with insects by migration from the continent, and the junction of England to the continent was probably on the eastern side, where the North Sea now rolls; and if the inter drainage of Europe were upon anything like its present plan, the British Channel must have been a vast estuary, leading to the mouth of the Rhine. Whilst England was then part of the continent, there must have been a constant, steady migration from the German side, of all the insects fitted to live in our island."

This is a very ingenious theory I admit, but can it be completely borne out by facts. And again, why should there not have been insects and plants in the British Isles at quite as ancient a date as in Germany, Italy, or even Asia? I am quite willing to admit that some have migrated and that others have been introduced through the agency of man; but that all have donè so I cannot. If we take *Erebia ephphron* as an illustration, it is evident that it could not have reached our mountains from the Alps, or the Pyrenees. It is not found in the Scandinavian peninsula, so we cannot suppose it to have come from thence. It is a purely mountain species, and not simply an inhabitant of colder regions; so that a glacial epoch alone would not be sufficient to explain its being amongst us, without there was a

chain of mountains connecting ours with the Alps and Pyrenees. It is also curious why *Vanessa levana* should be absent from our isles. Its caterpillars live gregariously on nettles, and it has a second brood which was described as a distinct species under the name of *Prorsa*. It is a species which can well adapt itself to any climate. There are also many insects common to England and America, but none that are peculiar to the two. However amongst plants there are two, *Eriocaulon septangulare*, which is found in the Island of Skye and the West of England, and *Spiranthes romanzoviana* which grows in the county of Cork, both of which occur in North America also and not elsewhere. I know it has been suggested these have been accidentally introduced, perhaps through the agency of birds. But why should such be the case? If we turn to the butterfly world again, we find that one species—*Colias chrysotheme*—occurs only in a very limited district of Central and South Eastern Europe, but in North America it occurs over a very wide range. Another instance of local distribution may be seen in a moth, *Acidalia degeneraria*, which occurs in the islands of Portland and Corfu. Another moth, *Bankia argentula* occurs in the East of England and the West of Ireland but not in the intervening districts. Which is most likely, that insects and plants migrated from Europe to America, or from America to Europe; from Germany to Britain, or from Britain to Germany? I think neither, but that the same natural causes which produced certain species in Germany, produced the same in Britain; and that the same natural causes which produced *Erebia epiphron* on the Alps, also produced it on the Pyrenees, and on the British mountains; and that their occurrence at these places is not the result of migration. Mr. Bates in "The Naturalist on the River Amazon" tells us he has discovered intermediate forms to exist between the *Heliconia melpomene* of Linnæus, and the *H. thelxiope* of Hubner, and consequently, that we have here in the existence of a complete series of connecting links, an actual example in recent times of transmutation of species. If a tendency to variation were a circumstance of very rare occurrence among the Lepidoptera, the discovery would certainly be very valuable as well as interesting, but we have also cases of climatal changes in our English Lepidoptera. Take for instance *Lycæna medon*. In specimens from the South of England the spot on the upper wings is black, when it is the *Agestis* of Huber; in Scotch specimens it is white, and it is then *Artaxerxes* of Fabricius; whilst in the county of

Durham intermediate forms, the *Salmacis* of Stephens are found. In the case of *Chortobius davus*, the depth of colour varies considerably, according as the specimen was from the mountainous districts of the North of England, or the low marshy grounds near Manchester. *Melitæa artemis* too, has its Irish and Scotch forms, in *Hibernica* of Birchall, and *Scotica* of Buchanan White. Now can such cases be taken as a transmutation of species, or is there any such thing in nature as transmutation of species? It is quite certain that climate, soil, and food plant do produce varietal changes, and that hybrids can be produced such as the dog; but I think it is equally certain that if it were so, that such allied species as the rook and the crow would not exist amongst birds, nor *brassicæ* and *rapæ* amongst butterflies. Neither would there be such allied species amongst moths as *Peronea cristana*, with its thirty-five named varieties, and *Peronea hastiana* with its twenty-one. Although both these species are closely allied, and both vary very greatly, yet they have never been known to run, the one into the other, or the one to produce the other.

In bringing this introduction to an end, I must remind my readers that I do not lay much claim to originality, for I have borrowed most largely from Buckler's Larvæ, published by the Ray Society, from the *Young Naturalist*, Newman's Butterflies, Stainton's Manual, and from other authors acknowledged in the body of the work. There is much more that might have been said on the earlier stages of butterflies, but as it may be read up in any work on British Butterflies, I have no wish to enlarge the introduction to undue proportions, and must conclude by thanking the Editor of the *Young Naturalist* for his kindness and courtesy in allowing the History of our British Butterflies to take up so large a portion of his magazine, and for allowing it to be spread over so long a period.

C. W. DALE.

Glanvilles Woolton, Dorset,
20th December, 1889.

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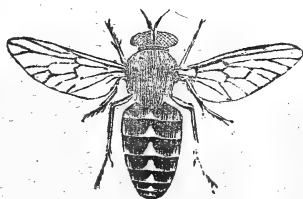
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Part CX.

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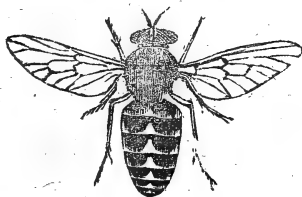
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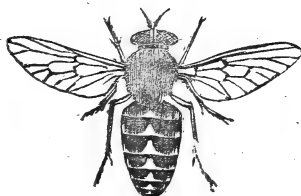
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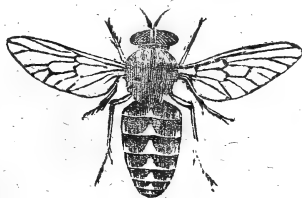
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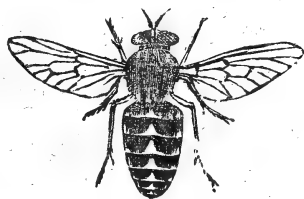
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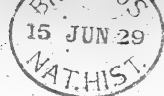
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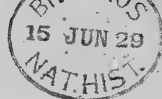
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Part CXV.

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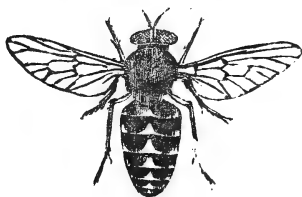
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Part CXVI.

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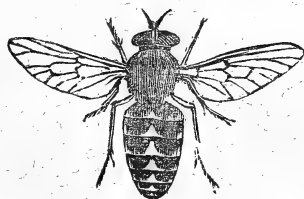
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Part CXVII.

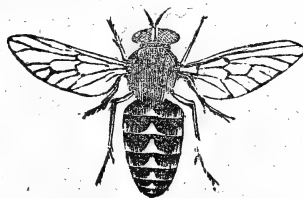
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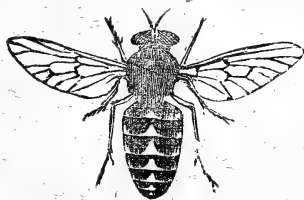
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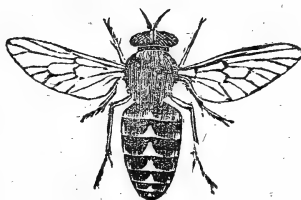
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PTEROPHORI.—The Editor will be obliged for lists of the *Pterophori* occurring in any part of Britain, especially from Scotland and Ireland, from which very few records have been made, in order that the articles now appearing may be as complete as possible.

CARABIDÆ.—I am desirous of obtaining assistance with reference to the papers in the *Young Naturalist*, entitled "Gossiping Notes on British Coleoptera," and should be greatly obliged if Coleopterists would kindly favour me with a list of the *Carabidæ* which occur in their districts; also any particulars as to habitat, mode of capture, &c.—G. A. LEWCOCK, 73, Oxford Road, Islington, London, N.

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THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, The Bridge House, London Bridge, S.E. November 14th and 28th.



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Part CXX.

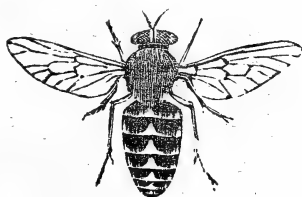
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